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AUGUST 1984

VOLUME 2
ISSUE 8

THE INDEPENDENT GUIDE
FOR APPLE COMPUTING

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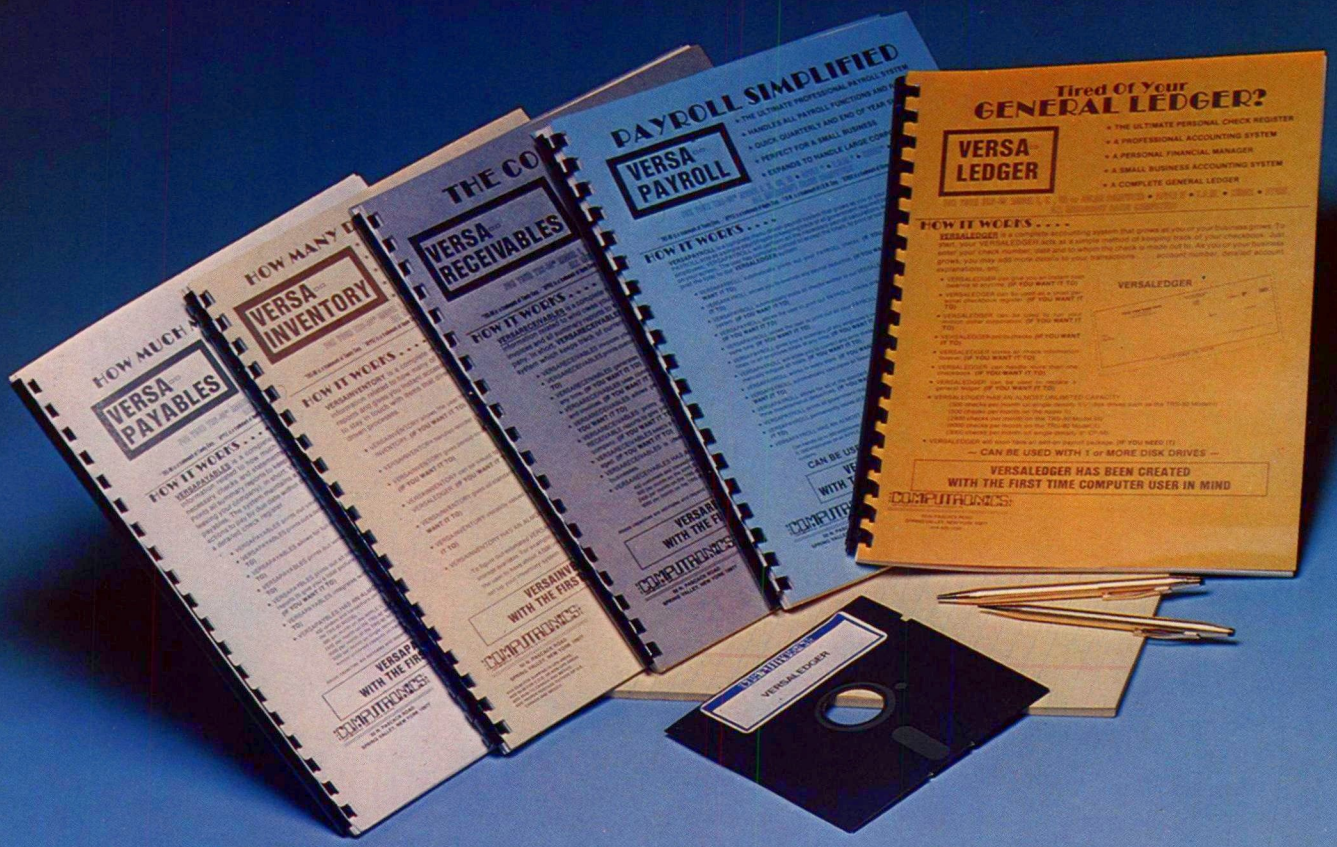

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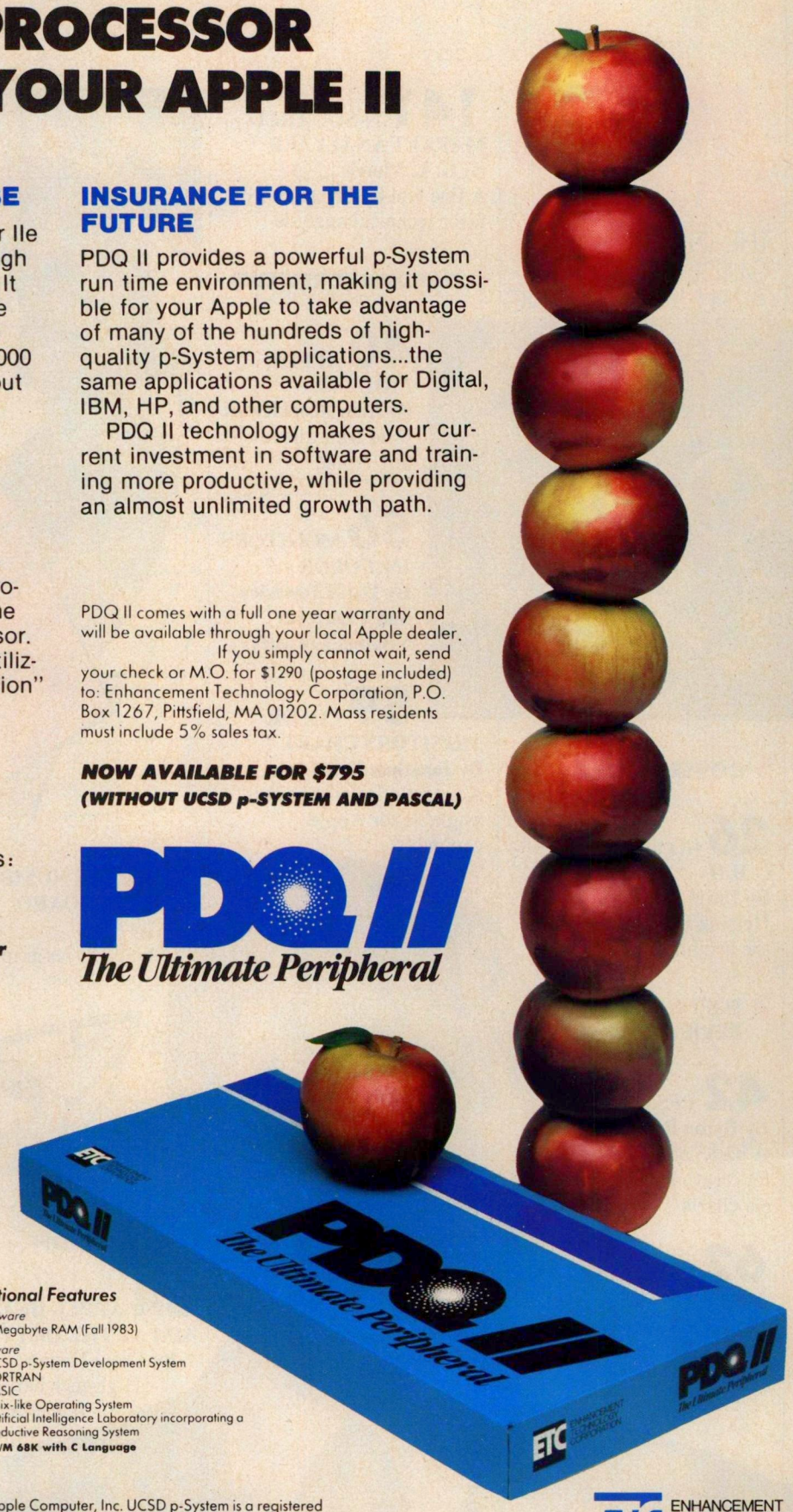

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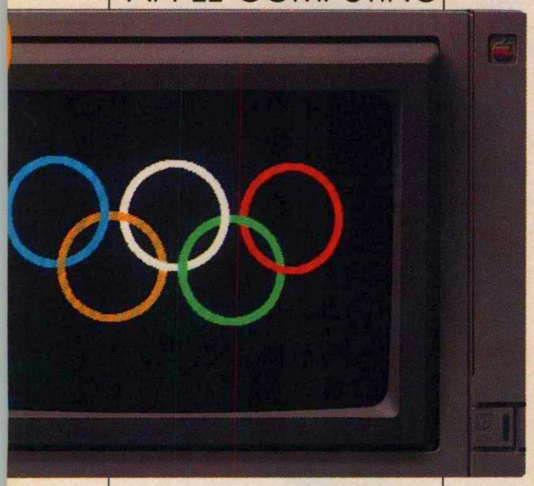

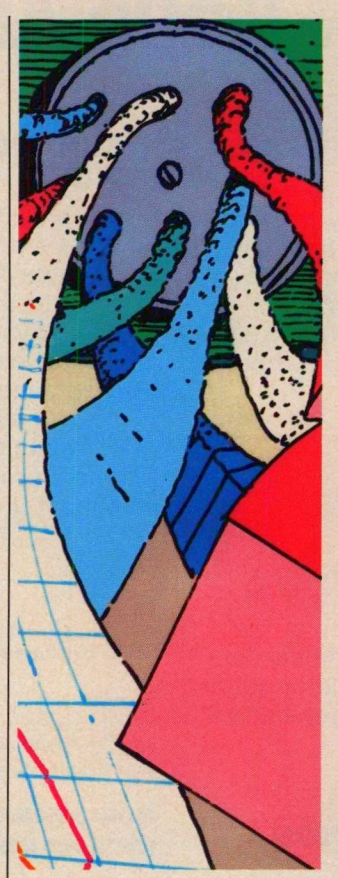

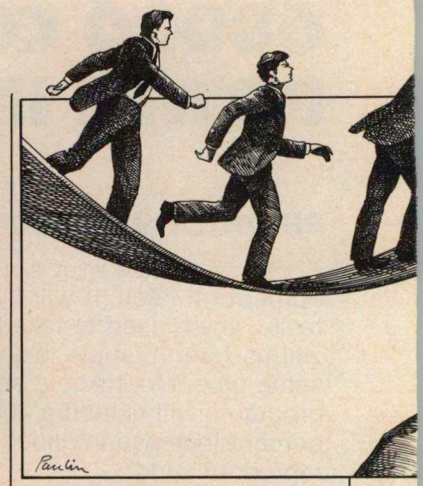

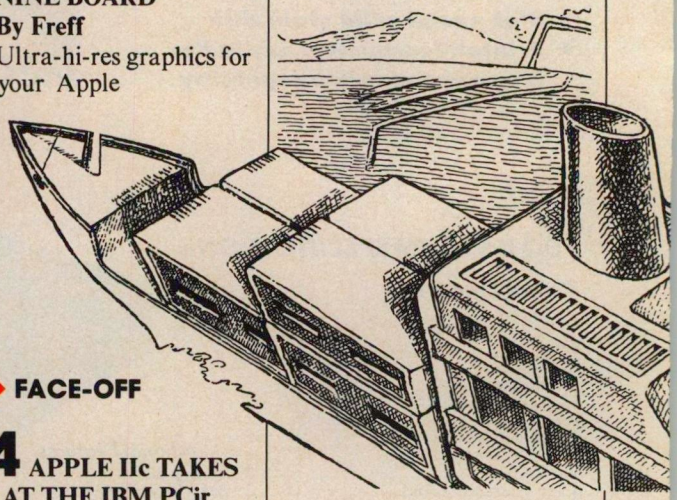

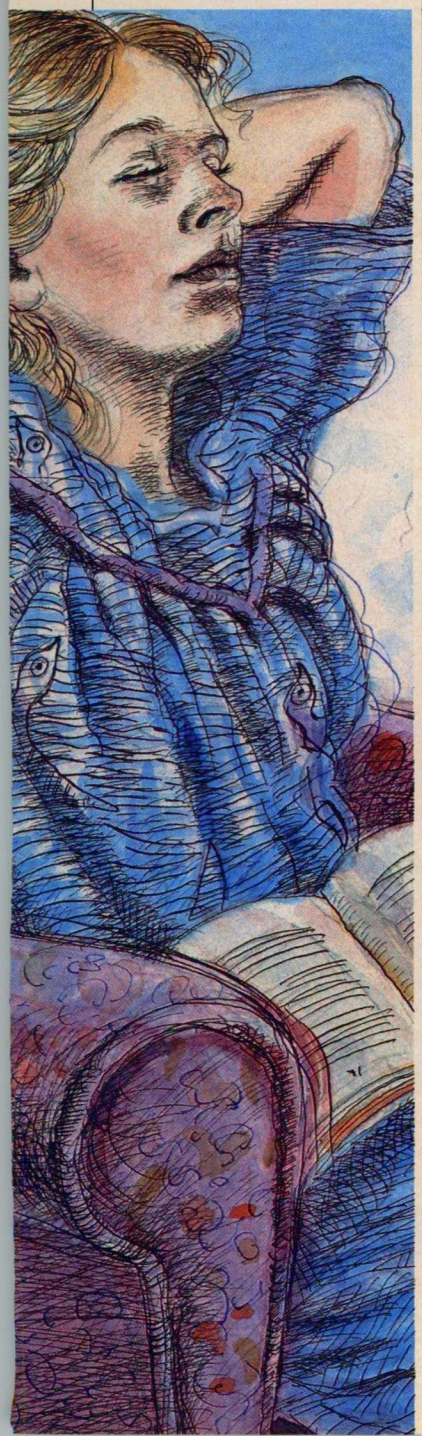

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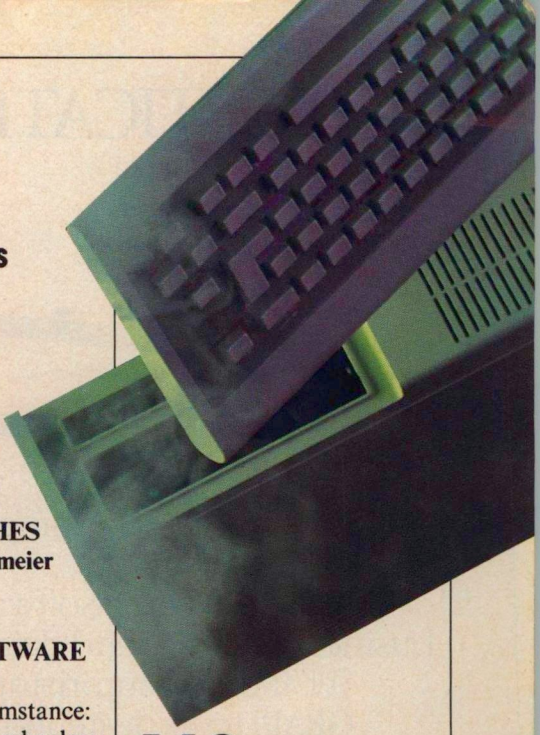

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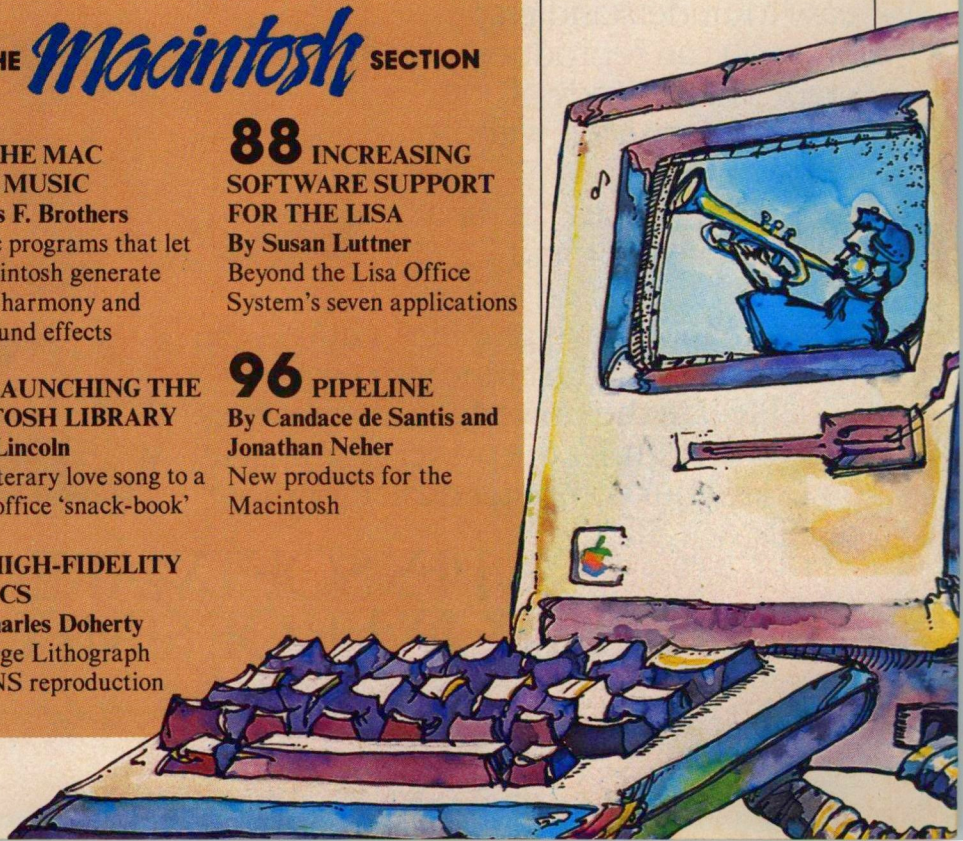

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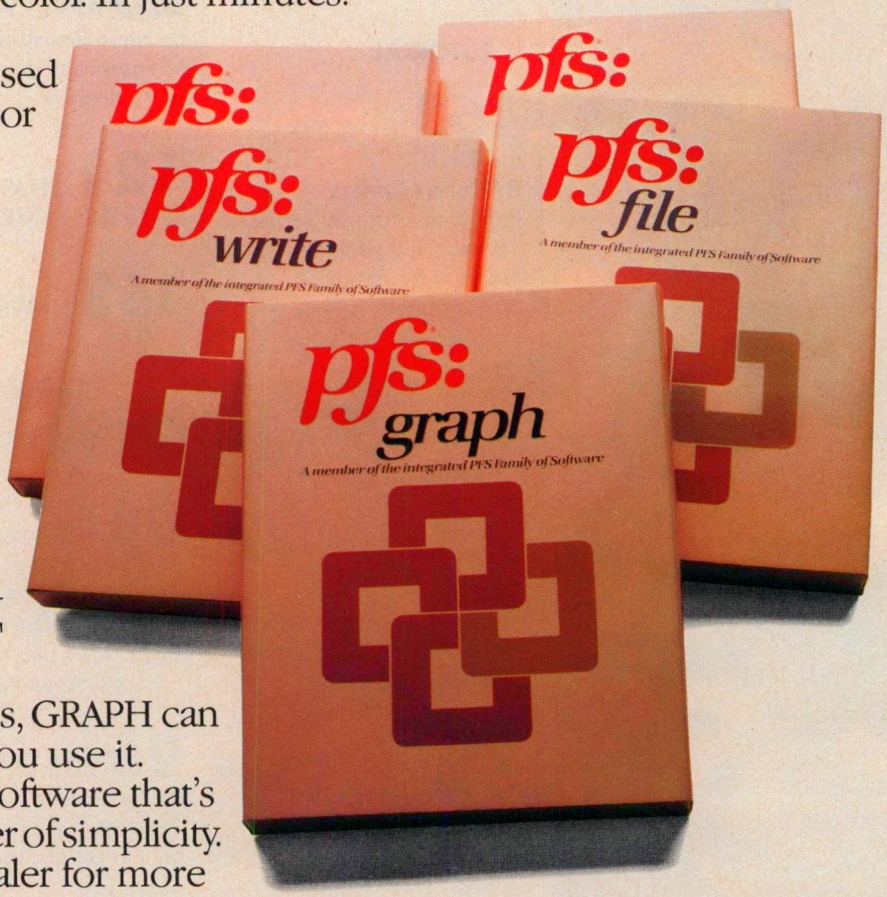

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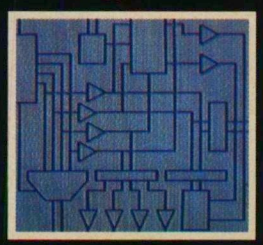

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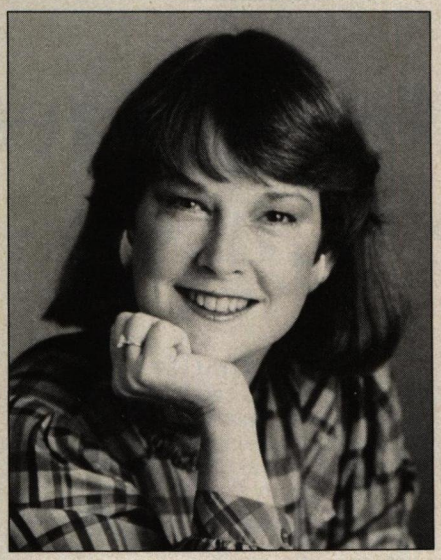
EDITORIAL
A MESSAGE FROM MAGGIE



Ever since personal computers came into vogue in the late 70s, many people who haven't bought one have been trying to figure out if they should invest in a machine for their home that might do little more than intimidate them. A debate has raged on for years in the microcomputer industry over uses of home computers. Balancing your checkbook and cataloging recipes are often-cited examples of home applications that can be computerized but are just plain easier to do by hand.

Justifying the purchase of a personal computer for office use is not too difficult because the applications are well defined and a plethora of software and hardware products is available. On the home front, however, applications have never been well defined, and development of home software has therefore lagged behind that of professional programs. Disappointing market figures for home-computer sales reflect consumers' uncertainty, and most companies, including Apple, are actively searching for the key that will open our homes to personal computing.

Many people who have bought a personal computer (often an inexpensive model) for their home have done so for its entertainment value. People who want educational applications for their grade-school children have also given some impetus to the home-computer market. As personal computers have cropped up in schools, many parents have recognized the significant impact that computers would have on their childrens' lives and have thus decided to buy a personal computer for their home.

Except for the areas of entertainment and education, the home market has basically been defined by the business market. Products such as word processors, database managers, and spreadsheet programs, which are widespread in offices, have migrated into the home to perform the same functions on a smaller scale.

Will personal computers ever find their way into the home on a mass scale, as television and radio have been able to do? I think the answer is yes. Games and education have opened or at least unlocked the front door, and telecommunications will further encourage computing in the home by hooking home-computer users to the vast world of on-line information and services—including information utilities such as CompuServe and The Source, which were leaders in the field of on-line information. Using your computer, your phone, and your modem, you can avail yourself of an ever-increasing array of such services. In fact, so many new information services are springing up that we have assigned a telecommunications expert to report on the new services every other issue.

Many recent experiments have attempted to determine the viability of telecommunications services such as telebanking and teleshopping through videotex services. Although the market for such services is still relatively small, teleservices will someday be as much a part of our lives as driving to the store or the bank is today.

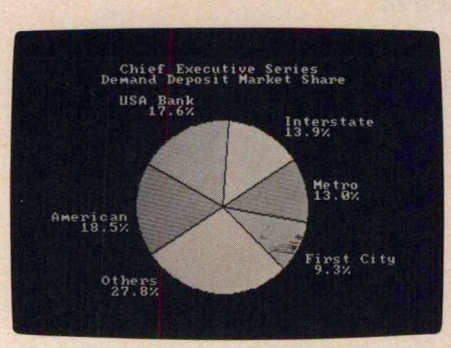
Telecommunications does not stop with on-line information and teleservices. Software companies are developing products to address the needs of the growing numbers of people who telecommunicate. Software Publishing Corporation, for example, recently introduced a new terminal program called PFS:Access (the Apple IIe and IIc version will be available in September) which helps users log on to the information services easily.

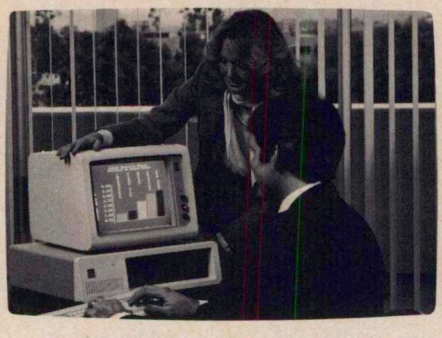
I am especially excited about educational telecommunicating, using a home computer to take accredited courses. Educational institutions are responding to the changing times by "going electronic." One of the most publicized examples of this progressive form of education is Ronald F. Gordon's new venture called TeleLearning. The Electronic University system that TeleLearning Systems, Inc., has developed connects students' personal computers with the personal computers of instructors via the telephone. Several major universities have signed up with TeleLearning to offer accredited courses. For further details, see "Electronic U" by Russ Lockwood (page 98).

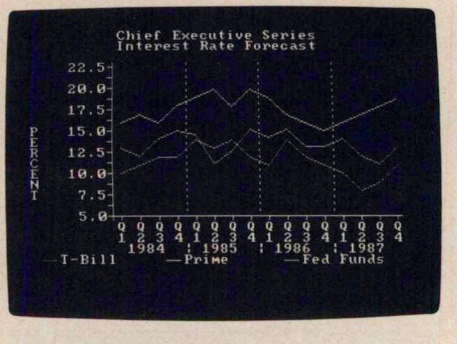
Presently, one of the main problems with telecommunications services is the cost. It is not cheap to hook yourself up to telecommunications services—the hourly charges can cool your ardour quickly. As the competition heats up, though, the services will probably have to vie for customers by reducing their prices.

So, when will the home market come into its own? Your guess is as good as mine, but I wager that 1985 will be the year of the home computer.

Maggie Canon







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LETTERS TO THE EDITOR

FUTURE TRENDS

Dear *A+*,

Thank you for an exceptionally good magazine. I found the May issue to be just what I was looking for! I marvel at the artistry and workmanship of the magazine in addition to the well-written and very relevant articles.

I spend a lot of time working with computers both at work and at home. I keep my eyes open for ways to expand the usefulness of the Apple II. To me it seems quite certain that computers of the future will have huge memory capacity by today's standards: megabytes, gigabytes—you name it. Already many microcomputers have a megabyte or more of main memory. Disk drives and other mass-storage devices will soon be able to store so much data that people can truly have computerized libraries of their own. Another future trend I see is toward very-high-resolution graphics. Someday we'll see graphics so good they will look like today's videotape! Though that may take a few years to reach the consumer level, I doubt if it's long until a much higher resolution becomes usual. I think computer speed will skyrocket. Faster processors, quicker programs, and larger memories will speed up the work of the computer. These are some main things I look for—memory expansion, better graphics resolution, and faster processing. Your magazine has valuable information in all these areas, comes in a well-crafted and artistic package, yet costs less than most other computer magazines of comparable size. Amazing!

Carl Stocker
Indianapolis, IN

APPLE/IBM DIFFERENCE

Dear *A+*,

I would like all of you at *A+* to know how much I appreciate your magazine. I am a sophomore in high school, and I've had an Apple II Plus for a year and a half. I've taught myself BASIC programming from the Apple manuals and the Apple II User's guide. Therefore, I cannot understand most of the complicated articles that some magazines seem to be obsessed with. I like *A+*'s blend of media for people at different levels of programming.

My main purpose in writing is to commend you on an article in your May issue, "The Apple/IBM Difference." Many articles in computer magazines are written only to be informative and usually end up being pretty dry reading. This article was the opposite. It kept me reading because I truly liked what I was reading.

After reading this article, I did notice that all of Apple's TV commercials deal with the computer user while IBM's commercials show different business situations that try to tell you that the machine in the middle of your screen will solve every business problem you've ever encountered. I'm sure it would be a tremendous help, but as of yet I have never seen an IBM PC actually design, produce, package, and ship hats all by itself!

I plan to pursue a career in computer design, and I'm sure that I would not ever buy a personal computer other than an Apple—as long as Apple keeps up the good work.

Todd Himas
Hackettstown, NJ

HARD-DISK DRIVES

Dear *A+*,

The article on hard-disk drives in the May 1984 issue of *A+* is one of the best articles on drives I've ever seen. It was very informative and explained many things I had not already known about hard drives. Your magazine publishes the best articles on things of this sort—will you be doing an article on monitors?

Norman Manes
Las Vegas, NV

Thanks for the compliment. Your wish comes true this month and in September.

DOLLARS AND SENSE

Dear *A+*,

I would like to thank you for the review of Dollars and Sense in your March 1984 issue. There were, however, a few minor points that I would like to clarify.

The name of the company is Monogram (not Monograph, as in the review), a division of Tronix Publishing, Inc.

The next point has to do with budgeting. Dollars and Sense does not require a budget to run the program. In fact, we do not recommend the use of a budget when beginning with Dollars and Sense, but rather that the user formulate a budget, if desired, after having entered a few months of data.

Another point has to do with choosing an account name. Besides typing in the first few letters of the account name, the user can use the left- and right-arrow keys to scroll through a list of account names in alphabetical order.

Finally, I would like to mention our Product Support Program. The program, for a one-time fee of $20, includes not only backup disks but also unlimited use of our Customer Support Group during business hours, free updates, and our newsletter.

Tronix Publishing, Inc.
Inglewood, CA

CORRECTION

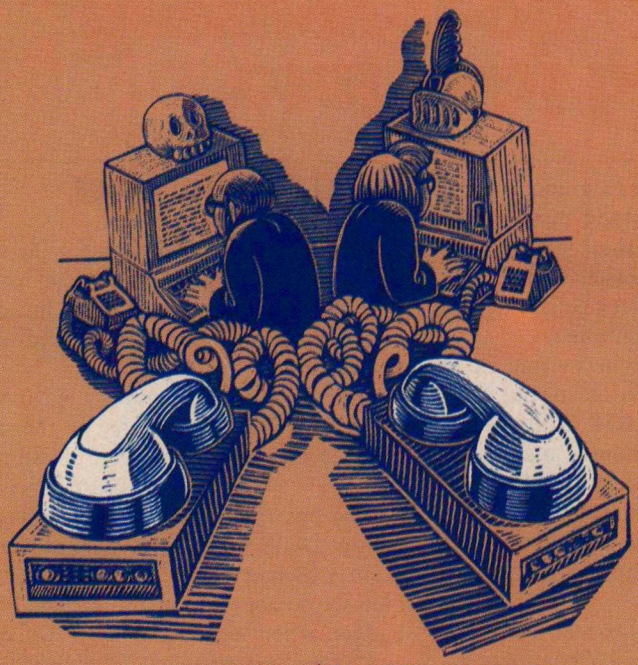
In the July issue of *A+* (Volume 2, Issue 7), three products in our Cursor Controllers Chart photograph were incorrectly labeled. The correct identifications are as follows:

The light pen identified as the Magellan Light Pen System from Magellan Computer is actually the Gibson Light Pen System from Koala Technologies, and that labeled as the Gibson Light Pen System is the Magellan Light Pen System.

The joystick labeled as Wico's is the Premium Joystick from Kraft.

We apologize for any inconvenience this mislabeling may have caused.

A+ DISPATCHES



HISTORY'S HANDMODEM

Apple computers haven't yet had a chance to leave footprints in the sands of time, at least not on time scales popular in the world outside of computers, where it still takes about 100 years to reach a fifth generation. In New York State, though, the Apple IIe will be intimately entwined with history—not as a mover and shaker, but as a messenger.

Four agencies in New York—the Lower Hudson Conference, the Federation of Historical Services, the Division of Historical and Anthropological Services of the New York State Musuem, and the Regional Conference of Historical Agencies—recently won a grant of four Apple IIe systems through Apple's Community Affairs Program. Linked via telephone and modem, the IIe's will create the New York Historical Agency Network. The purpose of this statewide hookup is to help historians and other museum professionals keep abreast of information, avoid schedule conflicts, and help eliminate the feeling of isolation common in museum work.

COMPUTER COOL

Overheating is the bane of every computer, and now you can take the temperature of your Apple to make sure it isn't feverish.

Phillips Computer Systems now offers a set of three liquid-crystal thermometers, called Apple Thermonitors, decals that change color when exposed to higher than normal temperatures. Apply one decal to the top or front of your computer case, the second on either the left or right side, and the third on the switch plate controlling the light in your computer room. You compare the color of the decal's indicator band with colors in the decal's design to find out whether your computer needs a checkup

The Indianapolis-based company sells the decals at $3.95 for a set of three.

APPLE'S IMAGE

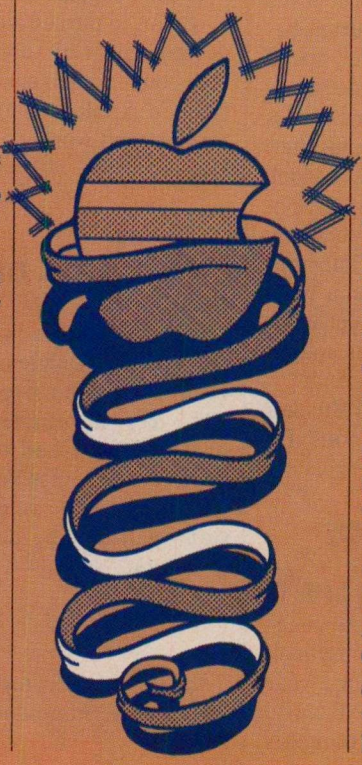
Not content merely to revamp its corporate structure and to announce a slew of new products such as the IIc, Apple Computer has begun to beautify its company logo.

The firm of Douglas Boyd Design & Marketing has scrutinized the myriad uses of the Apple insignia, with an eye toward developing company-wide graphics standards for Apple's multicolored mark.

This effort means more than visual polish for Apple, though. DBDM's work has helped marketing executives decide whether to translate *Apple* into foreign languages for the international market, or whether to use the apple symbol along with specific product names such as Lisa or Macintosh.

When Apple picks its new graphics standards, the results will be published worldwide, not in a fat standards manual, but on a diskette. Douglas Boyd, president of DBDM, said "We used to print up thick books, but that's becoming archaic."

Incidentally, the Apple logo has been shrinking over the years, from the apple with the company's full name, to the symbol and *Apple* alone, to simply the bitten fruit. Next time, will we just see the seed?



WAITING FOR THE BEST

While you're waiting for your Macintosh to arrive, you might ponder the fact that Apple Computer reportedly shines in its dealings with employees and agencies.

In a new book called *The 100 Best Companies to Work for in America*, by Robert Levering, Milton Moskowitz, and Michael Katz, Apple ranks high among high-tech firms. Nobody can ignore the specter of IBM—Apple employees may be "munched to death by Big Blue," warn the book's authors—but people who work there feel they're on the cutting edge of the market. Apple's young, feisty, share-the-wealth attitude is said to promote tip-top morale among its workers.

Apple's attitude extends to the outside world as well. In April, the company made *Adweek*'s annual Ten Best Clients list. "As a client, it's a 'moving target,' " says *Adweek*, meaning that the firm knows how to respond quick-

ly to changes in the volatile computer biz. Apple reputedly treats an ad agency "as a partner and a pro," even if Steve Jobs does keep demanding things that are "insanely great."

Wait, was that the delivery man at the door? Nope—false alarm. Well, your Mac may not have arrived yet, but it's still a comfort to know you're dealing with a company of distinction.

M.I.S. MANNERS

Should I set the salad fork to the left or the right of my disk drive? When computers are "handshaking," should the older computer or the computer with the most memory introduce itself first?

Judith Windt, a writer at Stanford University's Information Technology Services, doesn't answer these compelling questions of computer etiquette. She did tell the newspaper *USA Today* about some other computer dos and don'ts that may keep dealings in your electronic office on a polite level.

- Don't send electronic messages to the president of your company unless he or she asks.
- Follow up or precede a complicated E-mail message with an in-person meeting or phone call to clarify any questions.
- Send some pleasant messages once in a while, especially praise for a job well done.
- Don't peek at the messages on the screen of someone you're visiting.
- Never try to weasel into another person's office with an electronic message when the person has visitors or is talking on the phone.
- Keep copies of messages you send, particularly if you need a reply.
- Don't be too flippant with someone in electronic mail until you've established good relations. People tend to react to electronic messages in different ways.
- Remember that people in your office should come first, telephone calls second, and electronic messages last. Don't swivel away from a visitor to check your computer screen—remember that *people* built those computers, and they're what makes your business run.

COMPUTERS IN POLITICS

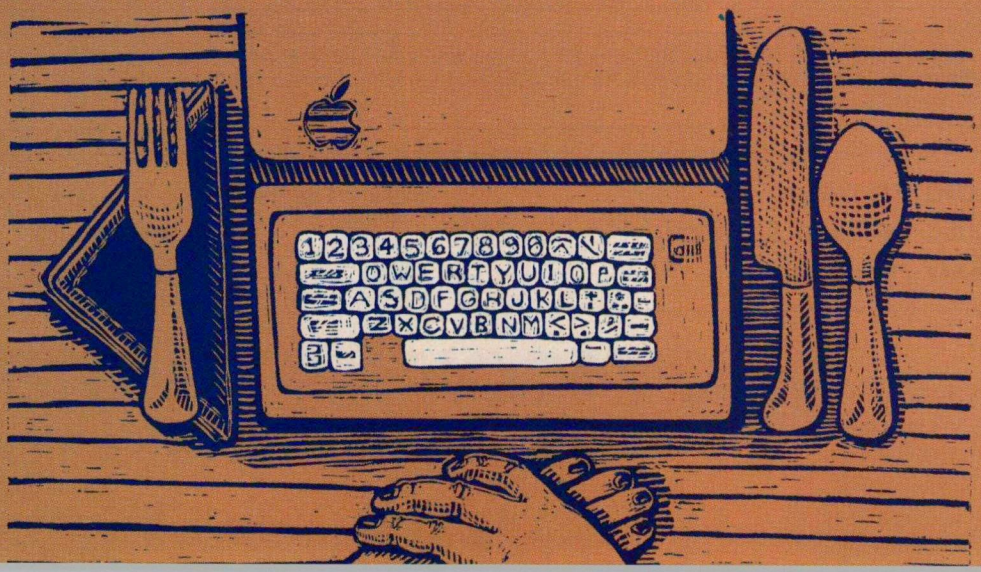
The days of the ward heeler who held a district together with pugnacity and patronage may *really* be gone, now that computers are working behind the scenes at election time.

One new program for the Apple II Plus or IIe is called Campaign Manager. This product from Aristotle Industries in Rowayton, Connecticut, helps raise campaign funds and conduct voter polls; reminds the candidate to thank volunteers and dun donors; prepares treasurer's reports that comply with state and federal regulations; and projects budget items to prevent a whopping postcampaign debt. Campaign Manager even pinpoints swing districts and undecided voters.

A spokesperson for Aristotle Industries said that during the 1983 campaign cycle "100% of the candidates won" who used this product. The product, designed chiefly for candidates and political consultants, is "the electronic equivalent of the smoke-filled room."

Candidates at all levels have cast their ballot for Campaign Manager, which costs $750. Two of the three top Democratic presidential contenders used it in their push to win national primaries.

If you're considering running for office, or if you want a peek at the inner workings of a computer-organized campaign, you might want to look at an electioneering database called Billboard, which Aristotle has set up. Anyone with a modem can call into billboard to see customers' descriptions of how they have used the program. Aristotle Industries' toll-free number is (800) 243-4401; hooking into Billboard is free, other than the cost of your call. +



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Z Card II	169.95	125.00
Smarterm II	179.95	151.95
Applied Engineering		
Time Master	139.95	119.95
Hayes Microcomputer		
Micromodem IIe with Smartcom II	329.95	260.95
Hayes Products		
Joystick Mach III (II+)	59.95	43.95
Joystick Mach II (IIe)	59.95	43.95
Kensington Microware		
System Saver	89.95	64.95
Kraft		
Joystick	59.95	42.95
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A2 Disk Drive (wo/Controller)	345.00	214.95
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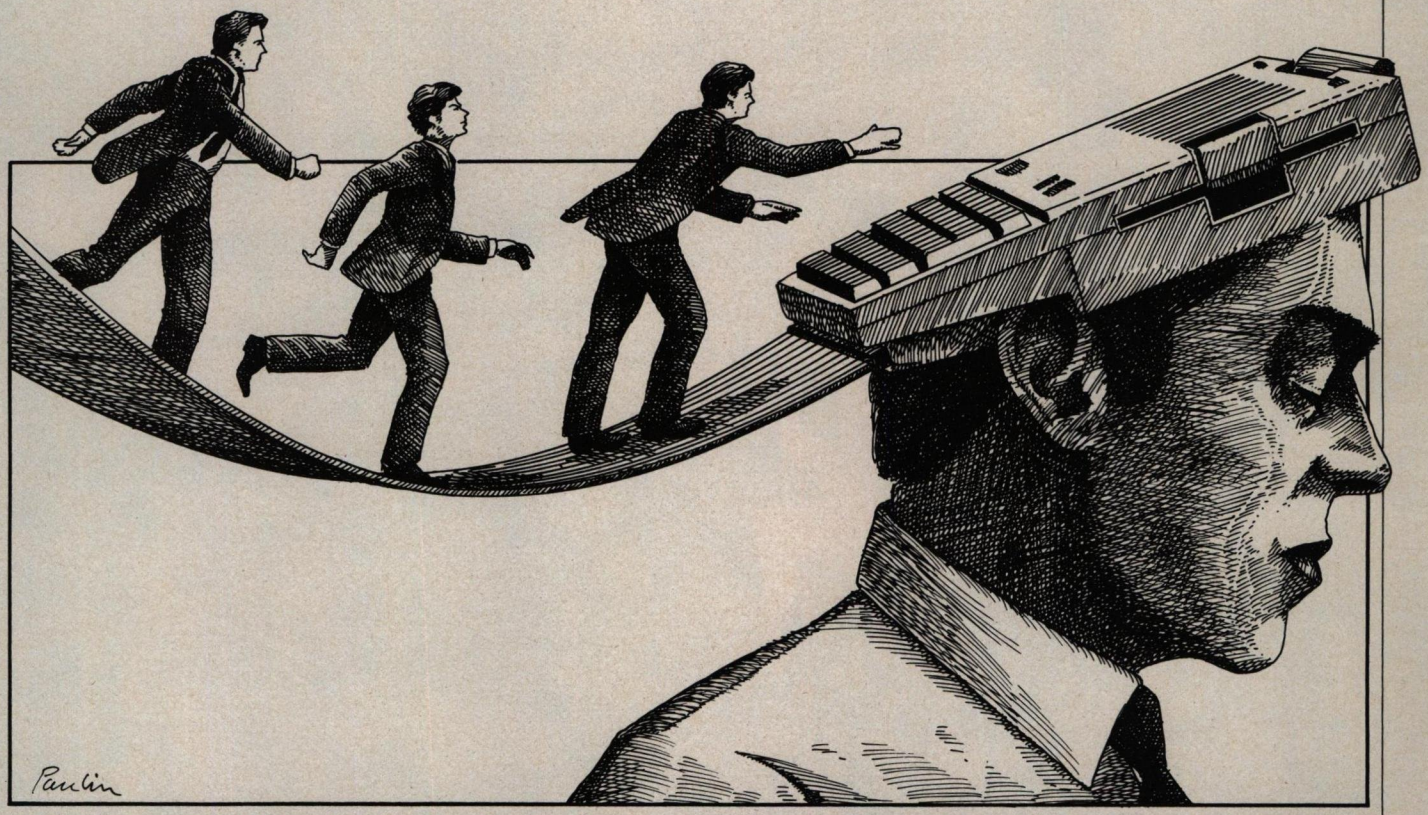

CIRCUITRY AND CIRCUMSTANCE

Psychology is now as important as technology in launching a successful personal computer—and Apple obviously put a great deal of effort into both aspects before it rolled out the new IIc. From its basic design through the official introduction at the special "Apple II Forever" Expo, the IIc is a blend of circuitry and symbolism.

Actually, attention to intangible factors is not new for Apple. Two of the important aspects of the popularity of the original Apple II were its appearance and industry support. Apple is selling the Macintosh as much as a philosophy as a product. The challenge of the IIc was to blend the continuity of the Apple II series of computers with the excitement of the Macintosh.

A few years ago, a company such as Apple could build a market for a computer as a series of gradually widening circles. Early buyers were content to write most of their own programs, and word of mouth was the most important advertising medium.

But those days appear to be gone forever. The biggest factor in the success of any personal computer is now its expected success. Major software developers expend their efforts only on machines that promise a large market. On the other hand, buyers purchase only machines for which they foresee availability of major software packages.

The challenge of the IIc was to blend the continuity of the Apple II series of computers with the excitement of the Macintosh.

Similarly, dealers concentrate their greatest efforts on machines that they think will sell well. Machines that get dealer support sell better than those that don't. Columnists in computer publications tend to write more about what they think their readers will be interested in, and readers are generally interested in what they have read about.

This chicken-and-egg view of markets and machines must have occurred to both Apple and IBM. In both cases, the major strategic decision was to make each company's home computer an extension of an existing product line. While IBM extended its line downward with its PCjr, however, Apple went upward and outward with the IIc.

The actual technological differences are not that decisive. Compared to IBM's offering, the IIc has advantages and disadvantages, and you'll find people arguing that one of the two is superior. You can accomplish most of the same tasks on either machine.

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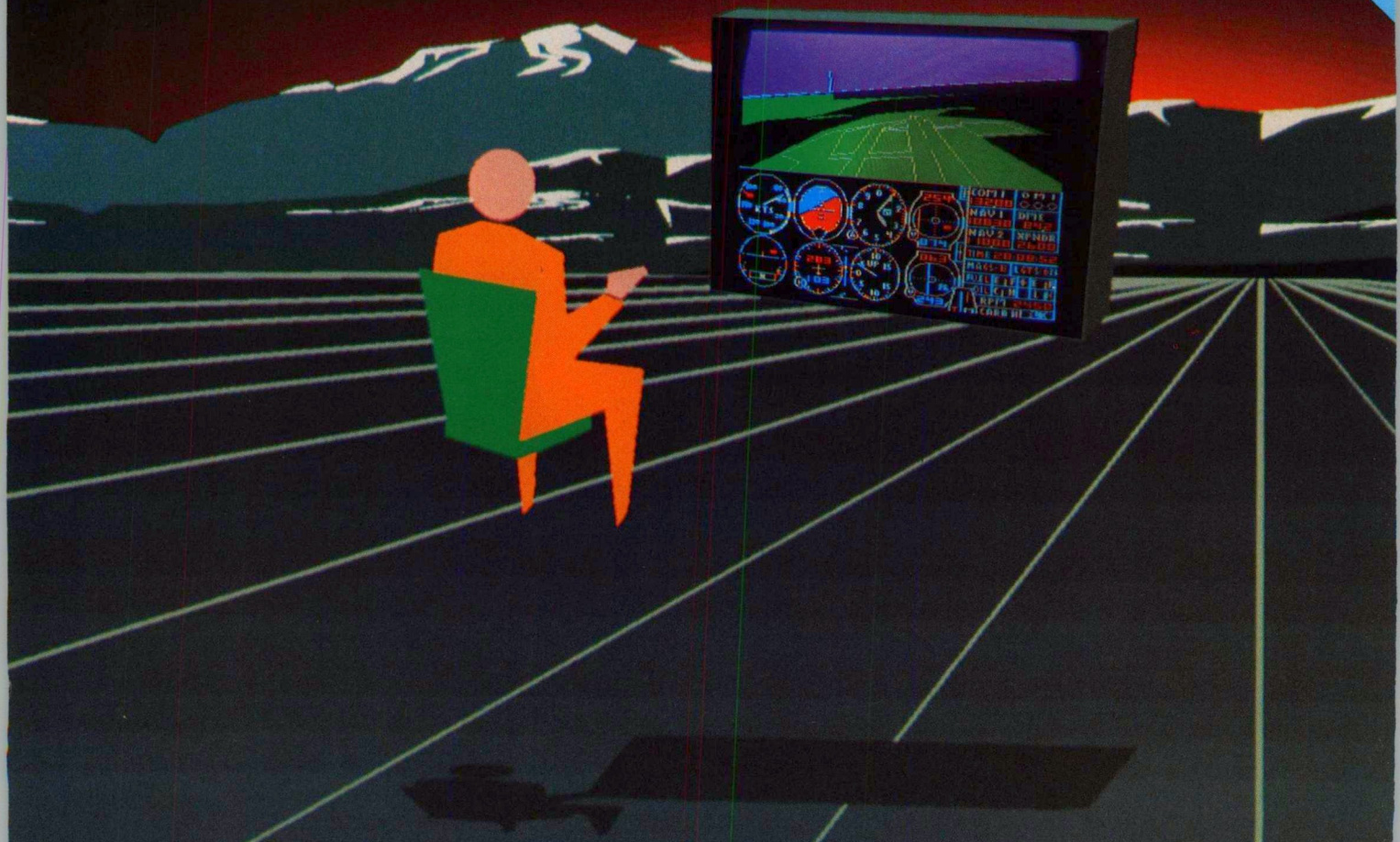
Flight Simulator II

For Apple II, Apple II+, & Apple IIe



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The psychological difference is amazing, though. Whereas many people see IBM's machine as one of Big Blue's few stumbles, most of us like the new Apple IIc.

Software to Go

Software availability, Apple plans to point out in its ads for the IIc, is one of the key advantages of this new member of the Apple II family. Because the IIc is almost entirely compatible with the previous IIe and upwardly compatible with the II and II Plus, thousands of commercially available programs can run on the IIc.

Having a huge existing software base is good for buyers who know what they want and are therefore looking for a software/hardware combination to get the job done. Although few people will want to explore more than a tiny fraction of that software, the large number of programs serves as reassurance that the computer is flexible and adaptable enough for unforeseen future uses.

On the psychological front, convincing prospective customers that a computer will have a lot of new software in the future is an important consideration. Although Z80-based CP/M machines can do most of the chores small businesses need, they're not selling very well, in large part because of the perception that they represent an obsolete technology.

To create momentum, Apple launched the IIc with close to two dozen software packages custom-tailored to the new machine. Many are rewrites or extensions of existing packages, but they're still different enough to be featured as the first of a stream of new products.

Whereas many people see IBM's machine as one of Big Blue's few stumbles, most of us like the new Apple IIc.

Balancing Difference and Continuity

In hardware design, Apple also chose a balance between newness and continuity. In its basic circuitry, the IIc is a slight revamping of the successful IIe design, but in its packaging and relationship to peripherals, the IIc strikes out in new directions.

Internal hardware compatibility allowed Apple to build on previous design work instead of working out a completely new scheme. In an industry in which short time intervals between conceptualization and product availability are vital for staying with the perceived forefront of the market, building on previous designs to shorten the design process is a good strategy.

Outwardly, the IIc packaging creates the impression of a new, up-to-date machine. Although you could easily argue that the styling difference is arbitrary and that the case of the II is just as modern and attractive as the IIc case, the size difference puts the IIc in a different class. Just as the original II was designed to look more like a typewriter than a physics-laboratory control panel, the IIc is obviously meant to remind you more of a tabletop radio or stereo receiver than a machine suited for an accounting department in a back room.

One major objection that many current computer users will raise about the IIc design is to the lack of slots for plug-in cards. This problem, too, may be more psychological than technical. Most II, II Plus, and IIe users, Apple says its research shows, have never plugged in more than a disk controller, a video card, and a serial or parallel

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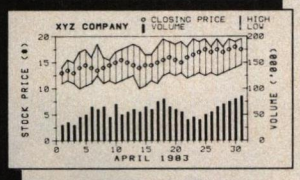

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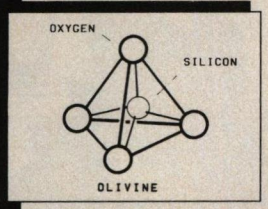

"The Prime Plotter contains more power than any graphing package I have used." "It can do many things not found in other packages; I know of no competing program which can do as much!"

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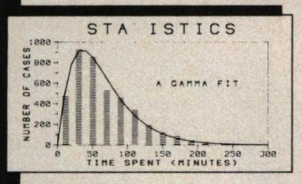

"The Prime Plotter is a surprisingly complete plotting package designed for a variety of applications. Routines to create X-Y plots, 3-D charts, bar graphs, and figure charts make the product the most powerful plotting package the reviewer has seen." "The product is superb for creating 'slide-show' presentations of generic data."

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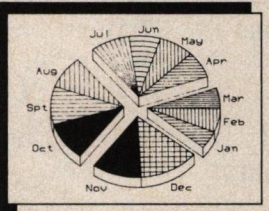

"Prime Plotter is a carefully conceived, well-executed package for business or scientific applications that can benefit from its great power." "Flexibility is the hallmark of this package."

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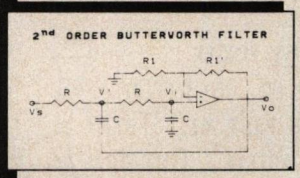

"At first glance, it's almost overwhelming." "While simplicity is a key, the myriad of possibilities featured can test the ingenuity of even the most knowledgeable user."

Business Software
Vol. 1, No. 5, Sept./Oct. 1983

PEELINGS II Rating

The Prime Plotter	A+
Apple II Business Graphics	A–
PFS Graph	B
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"In conclusion, if you are looking for the most powerful program for scientific or business use and are willing to spend several days learning the system, The Prime Plotter is your best choice."

Plotter Summary
PEELINGS II Vol.4, No.4, 1983

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card. The IIc provides these functions built in, so you don't need extra cards.

Apple's recommended route for adding functions to the IIc is through the serial ports. Depending on your point of view, this solution is either a significant restriction or a significant expansion of the IIc's capabilities.

If you formed your perceptions about computer peripherals more than a very few years go, using a serial connection may seem like a slow and inefficient method for connecting devices. Because the memory and processor parts of the computer were the most expensive parts, the entire system had to share them. As a consequence, microcomputers were designed so that every possible function had direct access to the signal lines for the memory and CPU.

Advances in the production efficiencies of integrated circuits have radically changed that approach. Now, an ordinary printer is likely to have as much processing power and memory as an original Apple II. A microprocessor costs less than the socket, wires, and connectors that link it with other boards. You can now let peripherals do more of their own processing and reserve high-speed channels for the few devices, such as disk drives, that still need them.

Among larger computers and even higher-priced personal computers, the trend is definitely toward networks. Instead of trying to feed all information through one machine, you let each device in the network do whatever processing it can locally and send only what needs to be shared among machines. A serial network is less expensive to install than a parallel one. Among smaller machines, the trend is toward serial connection, which is what Commodore uses on its home machines, and Hewlett-Packard for its HP-IL connections.

One major objection that many current computer users will raise about the IIc design is to the lack of slots for plug-in cards.

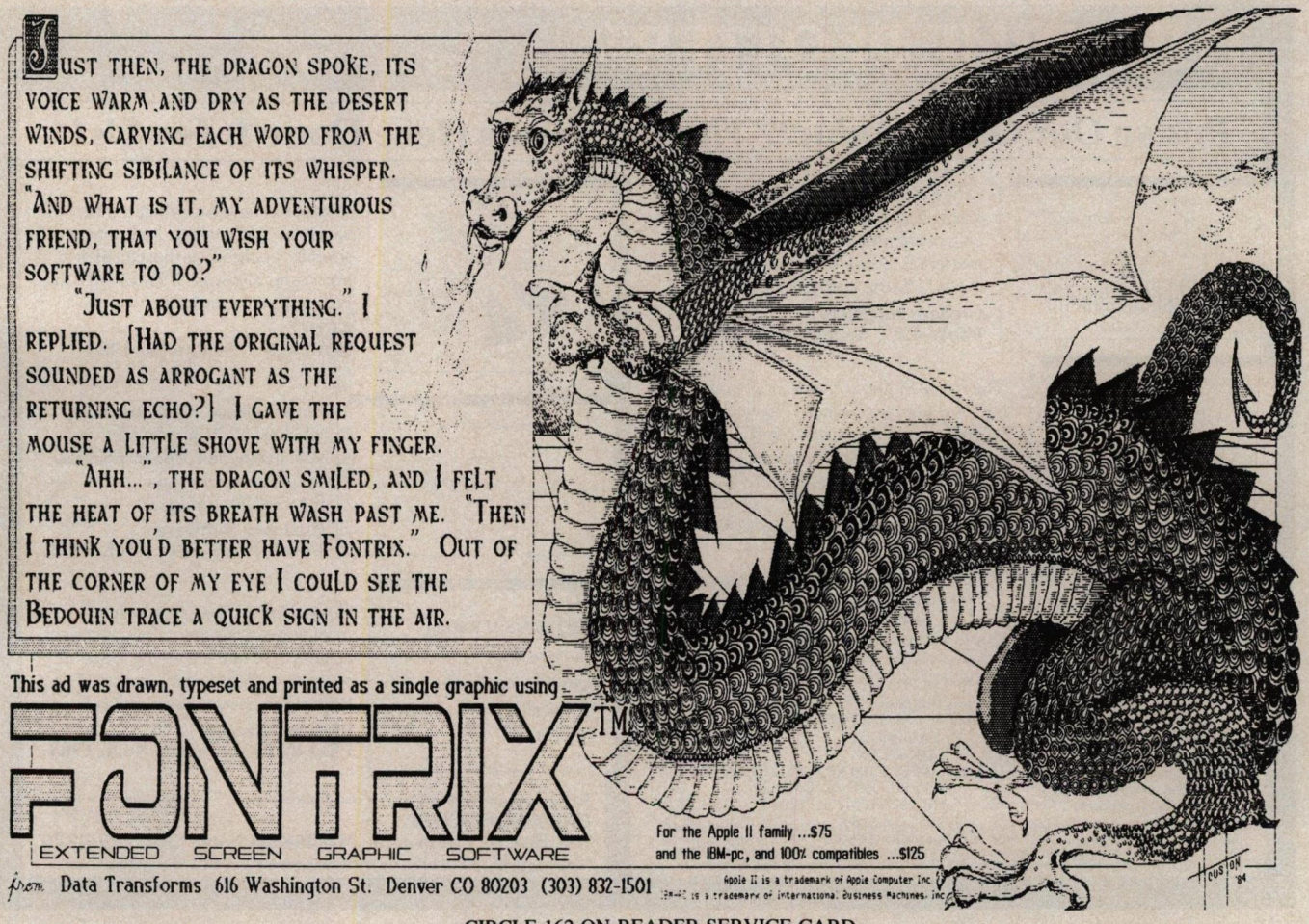
Serial connections have another important advantage—their plugs and cables can be made much smaller than parallel connections. Thus, Apple was able to keep all the connectors for the IIc on the back of the machine, even though the case is much smaller than that of the other Apples. On the psychological level, connecting the cables seems more like plugging in a telephone or hooking up a stereo than like assembling a forbidding piece of technology.

Winning the Dealers

Apple's apparent marketing strategy for the IIc is yet another balancing act. So far, Apple owes much of its sales success to the loyalty and effectiveness of its retail-dealer network. Apple wants very much to sell the IIc to people who ordinarily would not come into a computer store, however.

If, as Apple claims, the IIc is complete in its box and so easy to use that any reasonably intelligent person can set it up, customers will have little need for a skilled dealer. On the other hand, if Apple bypasses its dealers and sells the IIc through mass merchandisers, the dealers may retaliate by dropping the Apple line.

So far, Apple is covering its bets on this matter. The IIc, you may notice, is packaged in a box that is ideal for shelf display. Unlike the original box for the Apple IIs that you used only to carry



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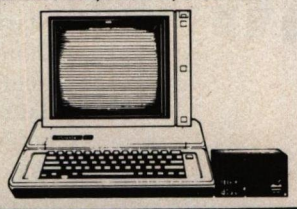

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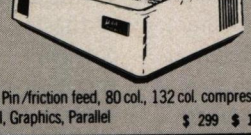

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the machine home in, the IIc box is designed to be seen. The listing of product features on the box indicates that Apple is not assuming that customers will always get a personal demonstration from a knowledgeable store employee.

You may never find the IIc at K-Mart, competing for impulse sales with Commodores and packs of gum, but it would be equally surprising if Apple did not expand the portion of its distribution that involves department stores, chains, and other high-volume outlets.

To keep sufficient dealer loyalty to give itself room to maneuver, Apple has made dealer relations one of the priorities of IIc marketing. Unlike the Mac-

You may never find the IIc at K-Mart, competing for impulse sales with Commodores and packs of gum.

intosh, which was announced before the company's stockholders, the IIc was announced at a special one-day exposition Apple set up for its dealers.

Extravaganza

The expo, a combined sales meeting, revival camp, and product rollout, was another foray into the vital psychological dimension. Every Apple dealer was invited to attend, and invitations were extended selectively to Apple employees, companies working on IIc products, press people, and industry-opinion leaders.

The major business of the day was psychological rather than educational. Rather than spend the time talking about the technology of the IIc or the way to present it to potential buyers, Apple orchestrated a morning presentation concentrating on the success of the Macintosh line, the immediate availability of the IIc product, and the strength of the forthcoming promotional campaign.

At its best, the presentation featured the effective use of technology from recent rock concerts or even the US Festivals in San Bernardino County, California (and at its worst, it was an ironic reflection of the Orwellian *1984* image of the famous Macintosh television commercial that previewed the machine). As Steve Jobs, Steve Wozniak, John Sculley, and others from Apple spoke, video projectors threw huge images of them up behind the stage.

Getting the IIc distribution off to a

fast start was high on the agenda. When it came time to unveil the IIc, instead of just showing a single IIc from the stage, Apple had many of its employees scattered throughout the crowd pull out hidden machines. Dealers were able to buy a machine right at the expo and take it home with them.

In the afternoon, Apple mounted a small trade exhibition featuring independently produced software and hardware for the IIc line. Again, the message was that you could put the IIc to work right now—it wasn't one of those announcements that products would be available "later in the year."

Software vendors were displaying a complete range of products, with home educational software the most-often featured item. Reflecting Apple's strong share of the school market, several firms were showing classroom packages, complete with teachers' manuals.

Apple itself is competing in the productivity-software line (although the rumored version of Appleworks that works with a mouse was apparently not ready for sale). Many other firms felt there was room for their products as well. Home-finance packages were the most visible, but you could also find word-processing, spelling-checker, and database programs.

Instead of just showing a single IIc from the stage, Apple had many of its employees scattered throughout the crowd pull out hidden machines.

The two most significant hardware products at the exposition were from companies new to the computer-hardware market. Discwasher, better known for phonograph-record-care products, was showing a battery pack capable of running a complete IIc. Quark, better known for its software, had a sample of its forthcoming hard disk for the IIc.

Most dealers seemed convinced that the IIc will be a winner and that Apple won't turn its back on them now. Developers, already struggling to customize their programs for the Macintosh and the IBM PC, were relieved that the IIc was so compatible with the IIe. Whether buyers are convinced is what you'll have to tell me. ✚

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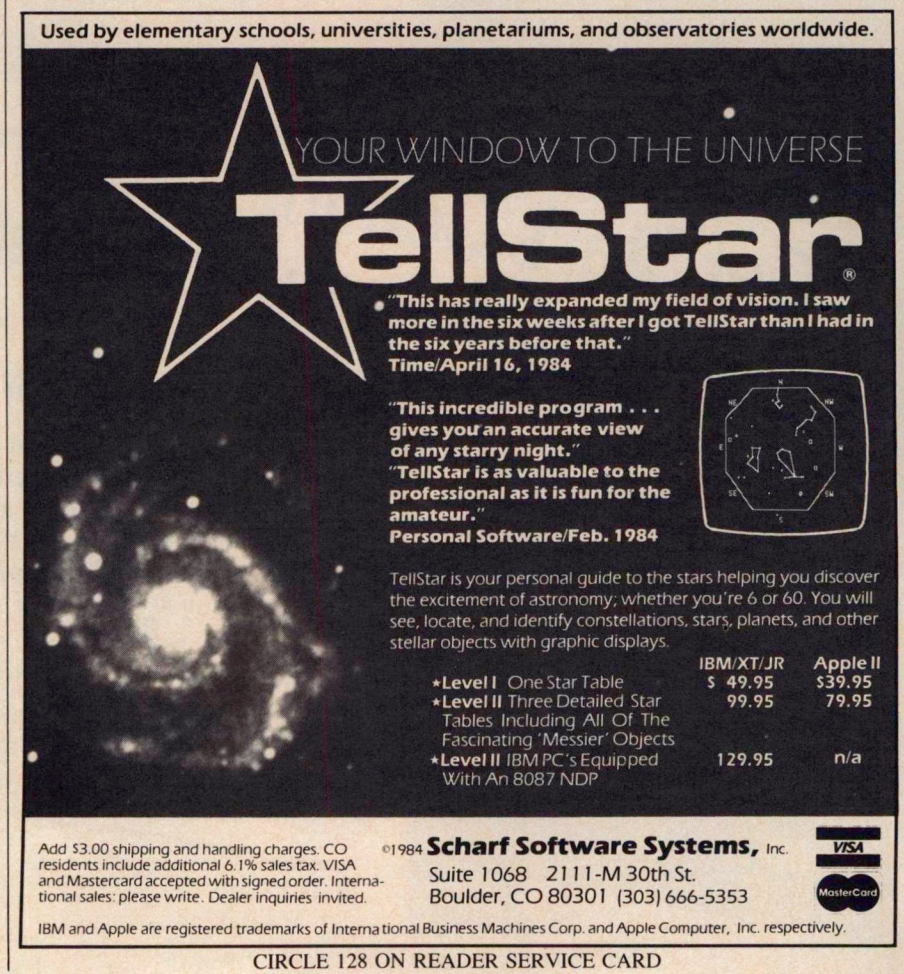

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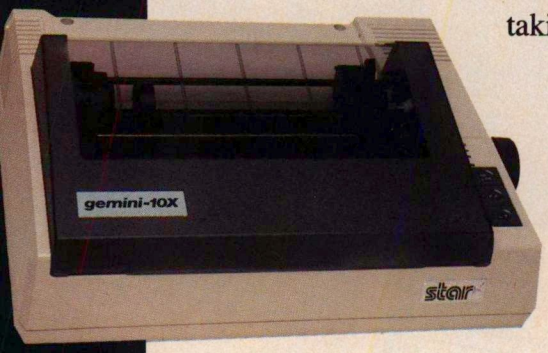

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MONITORS AND DISPLAYS

▶ APPLEWORDS
BY STEVE ROSENTHAL

A short glossary

BANDWIDTH
Literally, the spread between the slowest- and fastest-changing signal a monitor can reproduce. In practice, the bandwidth is the highest-frequency signal that produces a clear picture. An ordinary TV has a bandwidth of 2–4 megahertz (MHz), a computer monitor between 5 and 15 MHz, and a high-quality graphics display up to 100 MHz.

The TV's limited bandwidth prevents you from getting 80 sharp characters on a standard video screen. To produce 80 characters, you need at least 479 dots per line, requiring more than a 4 MHz bandwidth.

COMPOSITE VIDEO
Originally, this term referred to video signals whose picture and sync (timing) information was combined in one signal. In current use, it often means standard color video signals (also called NTSC or RS-170) that can be hooked up with a single shielded wire to a monitor. The Apple II series of computers produces a composite-video output (but you can get separate sync outputs or RGB signals if you need them).

Because the total signal capacity in composite video must split among the picture, color, and timing signals, you have less room for picture details. Thus, composite video is less detailed than the equivalent RGB display.

CRT
An abbreviation for *cathode-ray tube*, the standard picture tube used in televisions and video displays. The "cathode rays" are the streams of electrons that flow from the hot metal filament at the back of the tube to the screen.

ELECTROLUMINESCENT (EL) DISPLAY
A type of flat-panel display that produces light by electrically exciting solid materials. Its virtues are low power consumption, good contrast and brightness, and ruggedness. EL displays are used mostly on military equipment and on the GRD Compass portable computer. Until the cost comes down, you're unlikely to see any on Apples.

FIELD
A section of a standard video signal that includes a complete set of lines from the top to the bottom of the picture. In standard video pictures, each complete image is made up of two fields superimposed on each other so the lines of one fall between those of the other (interlaced video). Most computers, including Apples, instead send out identical fields that fit exactly over one another.

FRAME
As applied to the video signal, a complete picture image. In standard video, each frame is made of two fields. If the frame rate is not high enough, the image flickers or smears.

GREEN-SCREEN
A popular term for monochrome (one-color) monitors that use green phosphor. The standard display has light-green characters on a greenish-black background. Many people prefer this color combination to white-on-black or black-on-white images, but they originally came into use because green phosphors were relatively easy to tailor to the special requirements of electronic instrument displays.

HORIZONTAL FREQUENCY
The number of lines per second in a video signal. The standard for video in the U.S. is 15,750 Hz, or 262½ for each of the 60 fields per second. Some of the lines are not available because they're reserved for moving the beam back up to the top of the picture (vertical retrace), so computers that use standard monitors can't display more than 240 lines or 25 rows of characters.

LCD
An abbreviation for *liquid-crystal display*, the flat-panel technology of watch displays and the new Apple IIc portable display. The most common colors are the familiar black characters on a light gray background, but color LCDs are beginning to show up as well.

LCDs use little power, so they're good for portable applications—but they are difficult to make in large sizes, and the electronic circuits for driving detailed displays are complex. Thus, a display large enough for a computer screen is still more expensive than a video monitor.

LUMINANCE
As applied to video signals, the component representing brightness. In composite video, the brightness signal is the main component of the video signal, with the color and sync added alongside.

MONOCHROME
Literally "one color," this term applies to monitors with only one shade of phosphor. The most popular monochrome monitors for the Apple IIs use green screens, but some people prefer amber or black-and-white screens.

NTSC
Originally the abbreviation for National Television System Committee, the industry group that drew up the standards for the television signals used in the United States and most of the rest of the Americas. In the NTSC format, each picture has two fields of 262½ lines (525 lines to a frame), with 30 frames transmitted per second. Color information is added by the phase (timing relationship) of a color signal added at 3.58 MHz above the bottom of the video signal. Although Apple color output is not strictly within NTSC standards, it is close enough to let you use a standard TV or video monitor for a display.

PEL
An abbreviation for *picture element*. Some people use *pel* and *pixel* interchangeably, but many consider pels to be the smallest element that the display is capable of producing in its current mode—pixels are the

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smallest elements that it can produce in the most detailed mode in this definition. For example, the Apple II has 40 pels, but 180 pixels, to a line in low-res graphics.

PHOSPHOR

The chemical compound on the inside of the CRT screen that emits light when struck by speeding electrons. Phosphors differ in color, persistence (how long they remain lit after the electrons stop), efficiency (how much light for a given flow of electrons), and burn resistance (how well they can withstand a steady image without permanently showing that pattern).

PIXEL

An abbreviation for *picture element*, the smallest spot that can be turned on or off on a display. Pixels are limited by the number of dots and lines displayable on the monitor or the rate that the computer can produce.

RASTER

The pattern of lines that results when a monitor sweeps out one line under another across the screen. The computer only synchronizes the timing of the raster and turns the beam on and off; the monitor makes the raster itself. Having the computer supply information for a standard raster produces more cost-effective displays than having the computer control the placement of every line (vector graphics).

RASTER-SCAN DISPLAY

A display comprising a succession of sequentially painted adjacent parallel lines. Most computers, including all members of the Apple family, use this method.

REFRESH RATE

The number of images displayed per second. On a CRT display, too low a refresh rate causes flicker; on an LCD display, a low refresh rate causes smear and ghosting. Apples use the standard video-refresh rate for noninterlaced displays (60 frames per second in the U.S., 50 in Europe).

RESOLUTION

The fineness of detail that a monitor can reproduce, generally specified as the number of distinct lines that can appear on a screen. Many TV sets can barely reproduce 250 lines; a low-resolution monitor should do better than 350. A medium-resolution monitor may be up at about 550, and an expensive system meant for computer graphics can do better than 4000.

RGB

An acronym for *red-green-blue*, the three color signals that make up a color video image. Monitors that accept their input as these three separate signals allow more precise control of the color signals than do composite-video monitors and therefore generally offer better resolution. The standard output for the Apple II family is composite video, but you can get RGB adapters.

SPRITES

Graphic images that the video-display hardware keeps track of and that you can move across the screen as complete units. They greatly simplify graphics programming and allow rapidly changing displays. Standard Apple video boards don't offer sprite graphics, but you can now buy sprite boards from several vendors.

SYNC

Short for *synchronization*, the part of the video signal that carries timing information. Standard video (used by the Apple IIs), has 60 vertical sync pulses per second and 15,750 horizontal pulses.

VERTICAL FREQUENCY

In a video image, the number of complete trips per second from the top to the bottom of the screen. In the U.S. and most of the Americas, the standard vertical frequency for video signals is 60 Hz. In most of the rest of the world, it's 50 Hz. +

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▶ COVER STORY
BY DAVID F. BARRY

GO FOR THE GOLD

Helping U.S. athletes scale the heights in Los Angeles

Olympic athletes: What mysterious qualities allow them, year after year, to stretch their personal limits and the limits of their sport? Pioneers of a new science in sports analysis—biomechanics—are asking this question. Apple II computers are helping to answer it.

Biomechanics links the physics of motion to human anatomy. This summer, at the Olympic Games in Los Angeles, the U.S. Olympic Team will benefit from some pioneering work in biomechanics, and another high performer—the Apple II computer—is an important participant in that work. Linked to an array of highly sensitive tracking devices, high-speed cameras, and force platforms, the Apple II is providing scientists with the most striking images yet of Olympic athletes and the most precise details of their performance ever available.

"It is impossible for the human eye to quantify movement," says Dr. Gideon Ariel, one of the pioneers in biomechanics, who is chairman of the Olympics Board for Biomechanical Studies. The new science is based on the premise that the naked eye cannot capture the hundreds of moving parts of a body in motion. "The most important things in athletic performance—timing, relative speeds of dozens of limbs and body segments, changes in the center of gravity—must be weighed, measured, and compared to each other to be of any use."

Edwin Moses made his international debut at the 1976 Montreal Olympics. This hurdler not only stunned everyone by winning the 400-meter hurdles and capturing the gold medal, but he also beat his closest opponent by 8 meters, the longest winning margin in the history of the event.

Since then, Edwin Moses has gone

PHOTO BY DENNIS BETTENCOURT

COMPUTER GRAPHIC BY ADELE ALDRIDGE

on to win more than 100 races, without a loss, and he is now heavily favored to capture another gold medal this summer in Los Angeles. Intrigued by Moses' astonishing ability, Ariel took some digitized (high-speed, up to 10,000 frames per second) photographs in the hope of discovering its origin.

"Digitization" uses high-speed photography to convert athletic movement into highly precise, three-dimensional graphic images. The images reveal a wealth of information: the speed of the athlete's movement, the forces at work, and the angles or "displacement" at which the different parts of the body are interacting. In addition, scientists can study the entire movement at regular speed, slow motion, or as a frozen multiple image—from a top view, side view, or front view.

High-speed cameras first photograph a movement from at least two angles. The film is then projected onto a "digitizer screen," a special screen that is similar to a small movie screen. The scientist, using a special magnetic pen known as the Graf Pen, touches, on the screen, certain significant points on the athlete's body—coordinates—that are important to the movement.

The Apple II Plus computer (which has recorded the coordinates) and a Data General Eclipse minicomputer team up to interpret the data in these impulses and project it onto a video display as three-dimensional graphic images of the movement.

In the digitized photographs of Moses running the 400-meter hurdles, Ariel discovered a fascinating piece of information. When Moses jumped over hurdles, his body rose no higher than when he was running. On a frozen multiple image of Moses' complete action down the track and over the hurdles,

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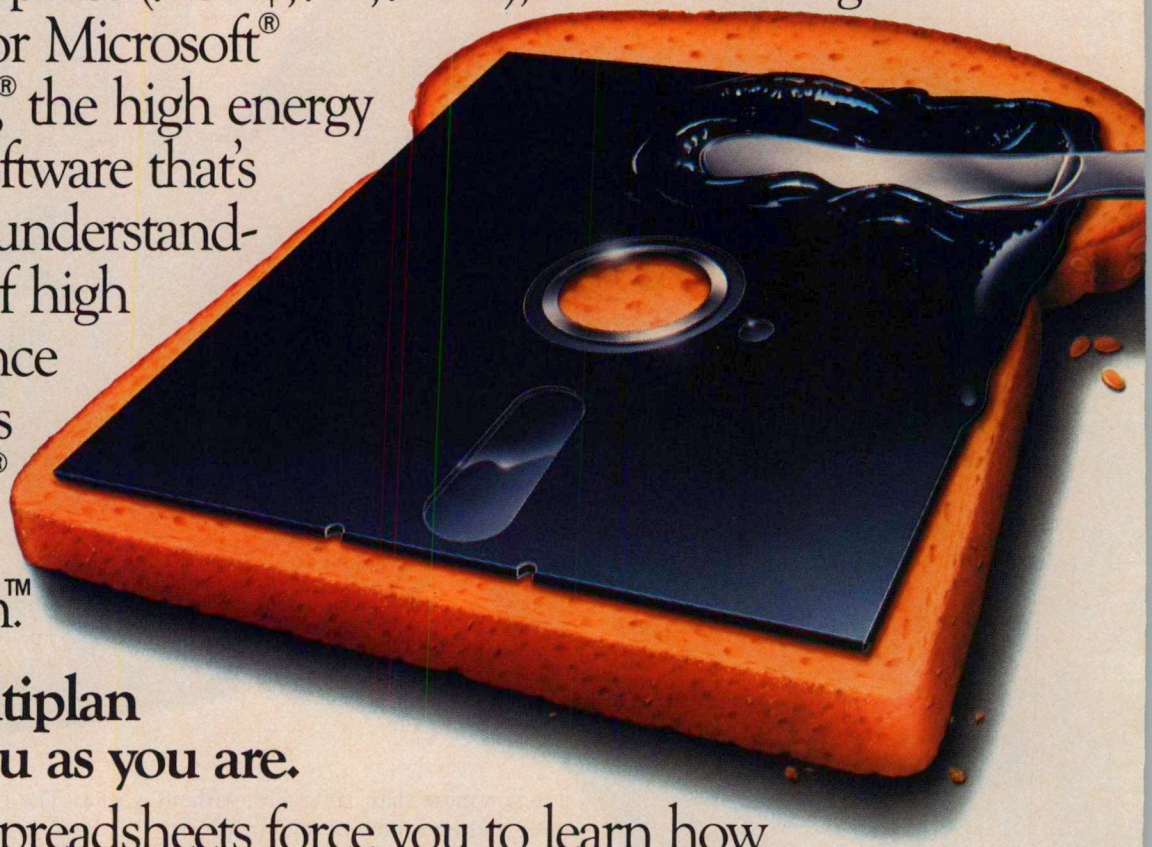

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you could draw a straight line along the path of his head.

"You assume when he's going over an obstacle his head is going up," Ariel says. "But not so with Moses. That's why he's so great. He's basically running horizontally over the hurdles while all the other hurdlers are going vertically."

Though Moses is in a class by himself, up-and-coming hurdlers could gain some valuable insights into their sport by studying Moses' techniques.

Force Platforms and Apples

At the Biomechanical Labs in Colorado Springs, Colorado, and the Coto Research Center in Southern California, Ariel has linked Apple II computers to an ingenious device known as a force platform, a two-foot-square steel platform that is supported at each of its four corners by highly sensitive "strain gauges." The Apples immediately register any movement or force applied to the platform, which is so sensitive, says Ariel, that he can detect the pulse rate of a person who is merely standing on the platform.

Race walkers, marathon runners, weight lifters, archers, and shooters are just a few of the athletes who have benefitted from the force platform. The athlete either steps up on the platform (in a stationary sport, such as archery) or runs across the platform (as in a mobile sport, such as running), and by completing an integral part of the movement while on the platform immediately provides scientists with a wealth of valuable information.

In Colorado Springs, weight lifters have learned more efficient ways to distribute their weight during a lift, thanks to the force platform. The platform, placed beneath the lifter as he goes through his motion, measures the forces on the lifter's shoe at each point during the lift. By feeding this information into the Apple, scientists can determine how much the lifter is shifting his weight from toe to heel as he lifts the weight. If his weight is too far off the "center of pressure" (the point on the shoe at which all the forces converge), he'll have difficulty lifting the weight. The position for optimal effort, the computer reveals, is when the lifter's center of pressure is nearest the athlete's natural center of support.

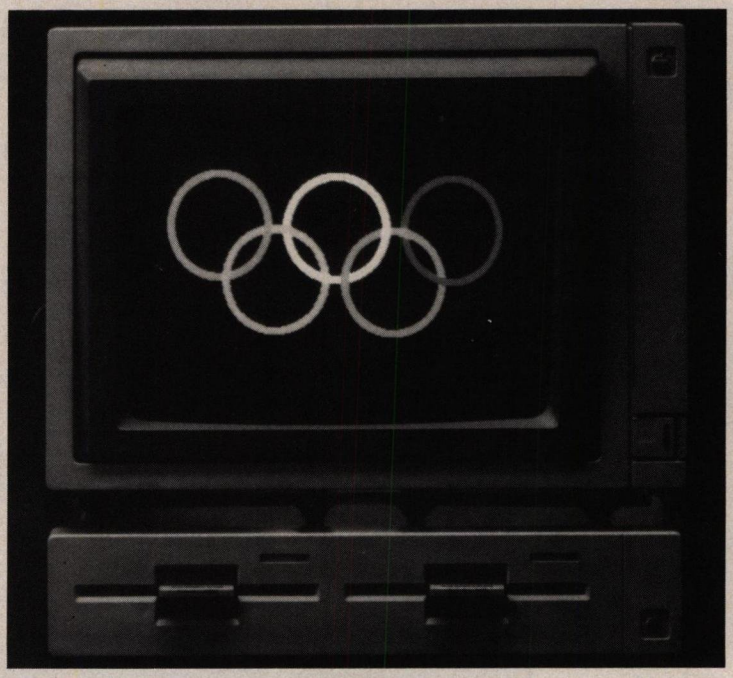
Says Mark Fenton of the Biomechanical Labs, "You can compare the differences in his own pattern. One day he is more successful than on another day. Why? What was he doing on one day that he isn't doing on another day?"

By comparing an athlete's effort either against his own performance or against an optimum standard, a scientist, in collaboration with the coach and the athlete, can suggest different techniques to improve performance.

Gary Scheirman, a biomechanical scientist in Colorado Springs, wrote many of the programs for the Apples. He believes that a scientist can most help an athlete by "identifying patterns of movement and quantity of movement." With an archer, for example, the scientist attempts to determine how stable the archer is by looking at nonessential movement that occurs before or during the shot and, if there is such movement, how much and what type it is.

Rick McKinney, a national-champion archer who placed fourth at the 1976 Olympics in Montreal, has a good shot at the gold medal this summer in Los Angeles. Scheirman analyzed McKinney's performance by combining the force-platform analysis with that of another piece of equipment called Selspot, a Swedish device that uses infrared light to detect motion.

The Selspot process requires rigging LED diodes to selected parts of an athlete's body—for example, on an archer's bow sight or a weight lifter's bar. As the athlete goes through his or her motion, an electronic infrared camera searches for the diode at the rate of 200 times a second. Each time the camera finds the diode, it records the position. This information is then fed into the Apple, which produces a composite graph indicating all areas of movement.



The Apples immediately register any movement or force applied to the platform.

"We learned from McKinney the importance of stability," says Scheirman. "This idea of stability was not always an accepted theory, since some coaches believed that movement was important in archery. But we're finding with the best archers in the U.S. that indeed they are very, very stable.

"We also looked at [McKinney's] position to be sure that his foot placement was correctly aligned with his center of pressure. We gave him information that he has been able to work into his stance."

Dr. Ariel has been working with computers and athletes for more than ten years. Ariel's success stories also include gold-medal discus thrower Mac Wilkins and the U.S. women's volleyball team, which, in the span of six years, has gone from unranked status to its current ranking as one of the top three teams in the world (alongside the traditionaly quicker and stronger Chinese and Japanese teams).

Applying Newton's Law

Mac Wilkins' first encounter with

Ariel came in November 1975, when the two met as part of a biomechanical study project commissioned by the U.S. Olympic Committee. After studying Wilkins' movement with the discus on film, Ariel discovered that in the movement toward the throw, Wilkins' front leg was absorbing energy that could go into the throw itself.

Citing Newton's law that every action requires an opposite reaction, Ariel says, "It's vital to have everything *stopping* in the discus. In the best throws we found a pattern. It is like using a fly rod, or snapping a towel. You have to decelerate the heavy parts—the legs and the trunk—so you can accelerate the light parts—the arm and the discus."

Wilkins' best throw until then had been 219 feet 1 inch. The world record was 226 feet 8 inches. Not long after putting Ariel's advice into practice, Wilkins set a new world record, tossing the discus 232 feet 6 inches. He then went on to win the gold medal at the 1976 Olympics in Montreal by throwing the discus 221 feet 5 inches.

Team Movements

Since biomechanical scientists often work with Olympic athletes who are near or at perfection in their sport, the need for improvement in technique is sometimes barely perceptible. On occasion, scientists study top Olympic athletes just to learn their techniques so that developing athletes can compare themselves and learn from the comparison.

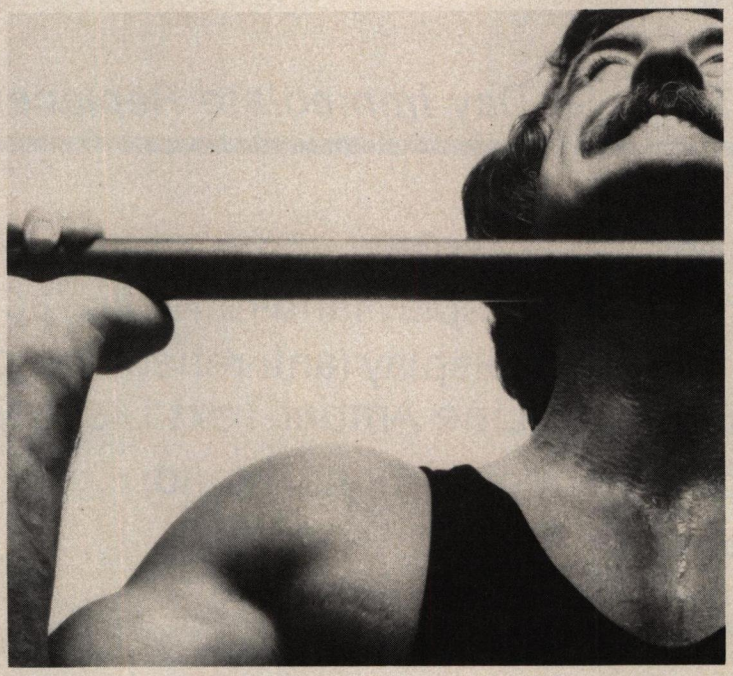
Taking his theories a step beyond work with the movement of individual athletes, Ariel wondered whether or not he could determine—through digitization—a *team's* key weaknesses and strengths.

In 1981, he found his answer. At world competitions that year between the U.S. women's volleyball team and the top international teams at the time—China, Japan, and the Soviet Union—Ariel used high-speed cameras to photograph the matches. Later, digitizing the information at the Coto Research Center, he discovered some telling information about the patterns of movement of the opposing teams.

One illustrative sequence of play, showing Flo Hyman spiking into the Chinese team, revealed a recurring flaw in the Chinese defense, which occurred just before Flo Hyman actually spiked the ball. Ariel found that in anticipation of the impending spike—before Hyman had even touched the ball—the members of the Chinese team would commit themselves 90% in one direction. Since individuals cannot reverse their motion quickly once they have committed to a certain direction, Hyman could, in future games, take advantage of this situation and spike to the point where the Chinese team was the weakest.

"Since they are always doing the same thing," Ariel says, "we can tell her, 'make sure you spike to the point where they are the weakest.'

Scientists can determine how much the lifter is shifting his weight from toe to heel as he lifts the weight.



"This is how we are beating the Chinese, the Japanese, anybody in the world. When we play with them, using this kind of sophisticated statistical analysis, it's like playing poker with somebody and knowing what their cards are."

When the U.S. began winning international tournaments, the rest of the world caught on, and Ariel and his cameras were banned from the games. But not before volleyball-team coach Arie Selinger had gotten the information he needed.

Minis to Micros

Though Ariel's work in the early years began on minicomputers—and the brunt of the work continues to be handled by minis—Ariel is shifting more of the burden onto microcomputers, which can now do for $15,000 what it took $100,000 to do years ago.

Says Ariel, "The Apple is fantastic as an intelligent storage device. We use Data General minicomputers to do the actual calculations on the raw data, but because the process of digitizing takes hours and hours, there is no reason to start up the minicomputers, which are very big and power-consuming. Instead, we use the Apples to collect the information and store it on floppy disks. Then, after three or four hours of digitizing, we use a transfer program to dump the data into the minicomputer, which does the actual calculations."

Since plotting each movement coordinate consumes only about two bytes of memory, some of the digitization can be done on the Apple. But, for now, the need for more memory and higher graphic resolution to do more in-depth calculations requires collaboration with the minicomputer.

Down the road, however, with expanding memory and 32-bit processing, Apples—and micros in general—should carry even more of the load. Ariel envisions a time not too far off when college coaches will do their own digitization on microcomputers located in their offices.

In the meantime, an expected strong U.S. effort at this summer's Olympics in Los Angeles owes plenty to Apples and biomechanics. +

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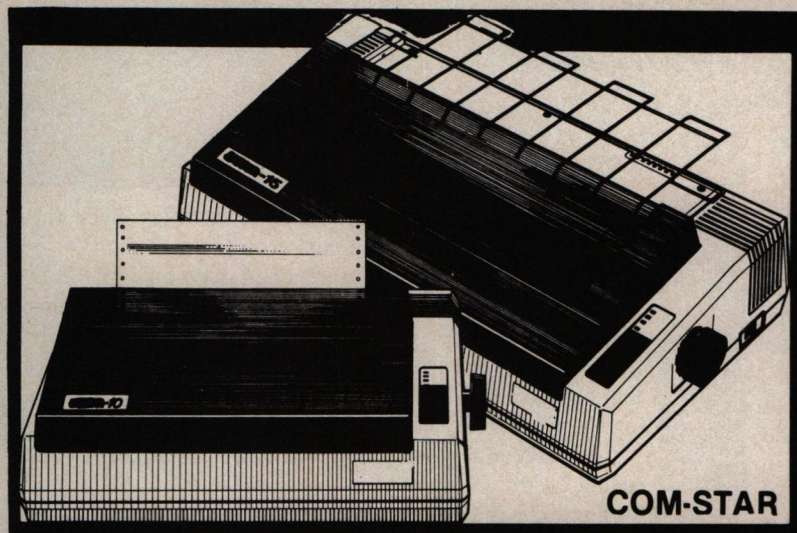

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TAKING AIM

THE APPLE IIc CHALLENGES THE COMPETITION

Like prizefighters working their way up the championship ladder, Apple and IBM have created home-computer contenders that are now poised in a heavyweight battle for the title of Microcomputer for the Masses.

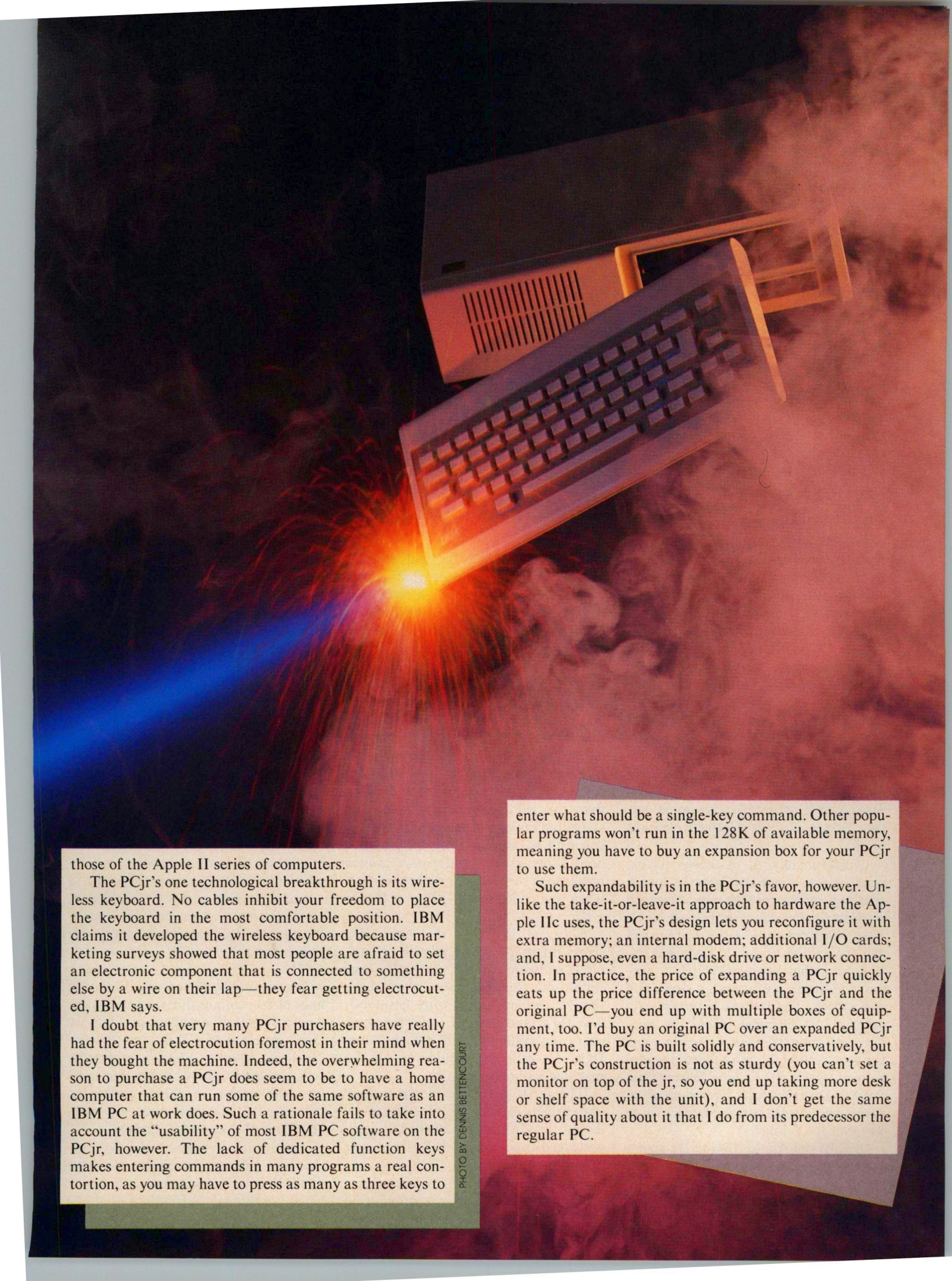
Which, if either, will be the ultimate winner? Until December 1983, IBM, with its PCjr, was the odds-on favorite of most prognosticators to reign over living rooms across the country. Then Apple IIe sales suddenly accelerated. Five months later, the six-year-old Apple II design was pummeling all serious competition, with most analysts predicting that the Apple II would outsell the PCjr two to one.

Here it is summer of 1984, and Apple and IBM are squaring off for the ultimate battle. IBM has beefed up its advertising budget (rumored to be in excess of $40 million for 12 months) and positioned the PCjr as the "computer at home for the person who has a PC at work." In the back rooms appear to be design enhancements that will eliminate the PCjr's Achilles' heel: the rubbery keyboard and inadequate memory capacity.

Apple, on the other hand, reached deep into its R&D labs and came out with a slimmer, trimmer, more-in-tune-with-the-times version of the Apple II, the Apple IIc. On top of that, Apple is promising extra IIc features that should reach the market later this year, just in time for the Christmas sell-off.

Let's start our comparison of the two contenders by focusing on the PCjr.

The PCjr is a scaled-down version of the popular IBM Personal Computer. IBM, apparently to keep PCjr sales from hurting those of the more expensive PC, limited the amount of internal memory and expansion possibilities and gave the PCjr this year's worst keyboard. On the plus side, the PCjr does sport an 8088 central processor, a more modern unit than the Apple II's CPU, and the graphics capabilities of the PCjr are much better than



those of the Apple II series of computers.

The PCjr's one technological breakthrough is its wireless keyboard. No cables inhibit your freedom to place the keyboard in the most comfortable position. IBM claims it developed the wireless keyboard because marketing surveys showed that most people are afraid to set an electronic component that is connected to something else by a wire on their lap—they fear getting electrocuted, IBM says.

I doubt that very many PCjr purchasers have really had the fear of electrocution foremost in their mind when they bought the machine. Indeed, the overwhelming reason to purchase a PCjr does seem to be to have a home computer that can run some of the same software as an IBM PC at work does. Such a rationale fails to take into account the "usability" of most IBM PC software on the PCjr, however. The lack of dedicated function keys makes entering commands in many programs a real contortion, as you may have to press as many as three keys to enter what should be a single-key command. Other popular programs won't run in the 128K of available memory, meaning you have to buy an expansion box for your PCjr to use them.

Such expandability is in the PCjr's favor, however. Unlike the take-it-or-leave-it approach to hardware the Apple IIc uses, the PCjr's design lets you reconfigure it with extra memory; an internal modem; additional I/O cards; and, I suppose, even a hard-disk drive or network connection. In practice, the price of expanding a PCjr quickly eats up the price difference between the PCjr and the original PC—you end up with multiple boxes of equipment, too. I'd buy an original PC over an expanded PCjr any time. The PC is built solidly and conservatively, but the PCjr's construction is not as sturdy (you can't set a monitor on top of the jr, so you end up taking more desk or shelf space with the unit), and I don't get the same sense of quality about it that I do from its predecessor the regular PC.

PHOTO BY DENNIS BETTENCOURT

Software for the PCjr is not as prevalent as IBM would have you believe. In analyzing the regular PC packages that run on the PCjr, as well as the PCjr-only programs available, I found that users' choices are relatively limited. The PCjr has only one disk drive, which further reduces the usefulness of much of the regular PC software the jr can use, since most PC software was designed to use two drives.

On the whole, the IBM PCjr is a meager offering with limited appeal to people who don't already own or use an IBM PC. Even those who look to the PCjr because of its compatibility with the PC would be well advised to look instead at the PC or a lower-cost compatible.

Convenience First

Apple's approach to redesigning the II to create the IIc seems to have been with convenience paramount. The use of a 65CO2 instead of the 6502 central processor that the IIe uses holds the promise that you will someday be able to run the IIc off a battery. Although Apple has no battery available at present, Discwasher, of Columbia, Missouri, offers the Cari, a carrying case and battery pack for the IIc that allows three to five hours of continuous operation before the batteries need recharging. Its 7½-pound weight, coupled with a built-in handle, make the Apple IIc convenient to carry from place to place (unless you have the RF modulator attached, in which case poor design work has made the handle almost useless).

The IIc keyboard is not the chiclet-like keyboard the PCjr sports, but neither is it a keyboard like the IIe's. Typing on it definitely takes some getting used to, but it is relatively pleasant to use.

Unfortunately, it is noisy—clack, clack, clack is not my favorite sound; that's one of the reasons why I dumped my electric typewriter in the first place. Futurists among you will note that you can change the Apple IIc keyboard setting from the regular QWERTY format to Dvorak layout with a single flip of a switch. The Dvorak keyboard layout assigns the most frequently used letters to your strongest finger, increasing your potential typing speed if you're a touch-typist. It's a nice feature, but until a Dvorak touch-typing program comes out, it's not particularly useful to us QWERTY folks.

Unlike the Apple IIe, the IIc sports no internal expansion abilities. On the back panel you'll find connectors for two serial devices (usually a printer and a modem), a mouse, a joystick, a second disk drive, and a TV or a monitor. Dedicated Apple II users will miss the internal expansion slots. No simple CP/M or other CPU-card options; no hardware-speedup enhancements, short of changing chips on the motherboard; and no internal modems will be available for the Apple IIc.

To make up for the lack of internal expansion, Apple has made the IIc comparable to a 128K RAM, 80-column-equipped Apple IIe, including an additional graphics mode that allows 16 colors on the normal high-resolution screen, plus 64K of additional RAM memory in which to "hide" pieces of programs or program data.

THE IIc OPENS UP NEW AREAS FOR APPLE TO EXPLORE WITHOUT HAVING TO ABANDON THE OWNERS OF PAST APPLE IIs.

One word of warning to current Apple II owners who are thinking about switching to the IIc: The IIc uses a *serial* port to communicate to printers, rather than the parallel port that Apple has traditionally used. Personally, I think this change is a wise decision, since the serial port is more flexible than the old Centronics parallel-port standard. On the other hand, those of you with parallel printers are going to need either a new printer or a printer buffer with serial-to-parallel conversion when you trade in your II Plus or IIe for a IIc.

Software is where the Apple IIc shows off its potential. Almost all Apple II software can run on the IIc (but watch out for programs that think they're talking to parallel printers). The IIc's (and current IIe's) standard operating system is ProDOS, but any DOS 3.3 software should run on the machine without problems.

The serial ports are set up to look like cards in slots on the IIc, thus mimicking the IIe's I/O method, but I experienced problems with getting some programs to print.

I also found a few minor idiosyncracies in Apple II programs running on the IIc. For instance, Brøderbund's Gumball, my favorite game of late, doesn't display high scores correctly on the IIc. For the most part, however, every Apple II software product I tried did work on the IIc.

One big drawback of the IIc is the "cable clutter" it quickly creates. First, a cord runs from the wall plug to the power supply and from the power supply to the computer. Then we have the video-display cable. Next, I added a mouse. A second disk drive added another cable. A printer added another. This number of cables really isn't any larger than the amount I had with the similar PCjr setup I tried. The mess of semirigid cables coming out the back of the diminutive IIc seemed out of place, though, and made the otherwise portable machine as movable as a boat anchor. Apple, are you listening? How about providing a snap-on add-on drive and printer?

What the Future Holds

A prime difference between the two computers is the future of the PCjr and the Apple IIc. The PCjr's future is inexorably linked with that of the PC. In a way, IBM has built itself into a corner, since it can't improve one without changing the other. I predict that the PCjr will become more and more like the current PC, while the PC itself becomes more and more like a minicomputer.

The IIc, on the other hand, opens up new areas for Apple to explore without having to abandon the owners of past Apple IIs.

This fall Apple expects to introduce a three-pound LCD display that clamps onto the top of the IIc's case, resulting in a totally portable Apple II that will weigh less than 11 pounds. It will be a breakthrough as a totally portable computer that is fully compatible with a standard desktop computer. Until now, portables have either been too heavy ("luggables") or sacrificed features to insure portability.

The LCD display Apple chose, which is made by Sharp, can display 24 lines of 80 columns of data and has the Apple IIe's full graphics capabilities. Don't expect the LCD display to be inexpensive, however. Sharp is reportedly selling these displays to manufacturers for $200 each in large quantities, meaning that the final price will probably be in the $500–$600 range.

In addition to portable displays, expect new software for the IIc, since the 65CO2 central processor can interpret a few additional instructions that the

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Apple II's 6502 can't. The biggest gains from these new instructions will be in speeding up and refining graphics-oriented programs, such as games. The addition of a mouse to the IIc will lead to easier-to-use software.

To assess the differences between the PCjr and the IIc fairly, I came up with a 20-category list and rated both computers on a scale of 1 to 5 in each category (see table). A rating of 1 indicates a poor showing, and a rating of 5 indicates excellent. Being a tough grader, I didn't give out many 5's; the ultimate home computer is yet to come, in my opinion.

The IBM PCjr and Apple IIc square off relatively evenly in the hardware categories. The PCjr's few weaknesses are in areas that you can improve by adding expansion cards to the system; the IIc's primary shortcoming lies in its lack of internal expandability. When we look at the basic configuration from each company, the Apple IIc gets a slight edge because of its two built-in serial ports and better keyboard.

The software contest is, well, no contest. The Apple IIc wins this area easily, and the PCjr flounders. I discounted the software that accompanied each machine, since both come with less-than-satisfactory "introductory materials."

In rating the additional software available for each machine, I found the PCjr software to be deficient in both variety and power (power being the ease and speed at which the software accomplishes large amounts of work). Apple IIc software excels in variety, although it, too, tends to lack power.

Just for fun, I decided to rank a few other computers using the same categories and criteria. The bottom table shows the results.

The Macintosh has the highest hardware score and the next-to-lowest software score, so look for it to be a contender in the future. The Commodore and Atari machines have admirable scores, considering their low price. The IBM PC and the Apple II both earned scores that show why they've been so popular in the past.

Overall, I found the Apple IIc to be a mostly enjoyable home computer with a bright future. I'm confident that I could make good use of it today and not outgrow it tomorrow. The IBM PCjr made a less-favorable impression. It struck me as a well-intentioned, yet flawed, product that is destined to shuffle along quietly in the footsteps of its father. ✚

HOW THEY STACK UP

This 20-category list rates the IIc and the PCjr on a scale from 1 to 5 in each category. A rating of 1 indicates a poor showing, and a rating of 5 indicates excellent.

HARDWARE	SOFTWARE	IIc*	PCjr**
CPU		4	4
Memory		3	3
I/O (as delivered)		4	1
Keyboard		3	2
Display		3	4
Convenience		5	3
Aesthetics		4	3
Expandability		1	3
Durability/repairability		4	4
Overall impression		4	3
TOTAL		**35**	**30**
	Amount available	5	3
	Variety available	4	2
	DOS ease of use	3	2
	APPLICATIONS		
	word processing	3	2
	personal-finance	4	2
	entertainment	5	5
	educational	5	3
	Power/performance	3	2
	Programmability	4	4
	Overall impression	5	3
TOTAL		**41**	**28**
GRAND TOTAL		**76**	**58**

*Apple IIc with Apple IIc monitor or TV set **IBM PCjr with 128K, disk drive, IBM monitor or TV set

AGAINST THE REST

The IIc ranked against a few other computers, using the same 20 categories and criteria but showing subtotals and totals only

	HARDWARE	SOFTWARE	TOTAL
Apple IIc	35	41	76
Apple IIe (64K starter system)	29	42	71
IBM PC (128K, 1 drive)	34	35	69
Commodore Executive 64*	33	30	63
Macintosh	36	25	61
Atari 800XL (w/drive)	31	30	61
Commodore 64 (w/drive)	30	30	60
IBM PCjr (128K, drive)	30	28	58
Coleco Adam	27	22	49

*Portable Commodore 64 with built-in drive and monitor

The word is out on word processors. Format-II® ranked number one.

We've always thought of Format-II as the finest, easiest to use word processor for Apple® II+, IIe and Franklin® computers. We're pleased that Peelings II magazine agrees. They judged Format-II best out of 18 leading word processors. Here's why:

Format-II makes editing easy.
There's our unique editing process: simple, mnemonic commands logically relate to the task you want to perform. To center text, you press [C]. To delete, [D]. To justify, [J].

And since what you see on the monitor is exactly what will print out, editing and formatting is always a breeze.

The Peelings II reviewer said, *"Format-II is one of the few word processors that is so comfortable and predictable, I would consider it as an addition to my small library of personal software."*

Peelings II Magazine Rating

FORMAT-II	**1**
SCREEN WRITER II™	**2**
PIE WRITER™	**3**
WRITE AWAY™	**4**
LETTER PERFECT 5™	**5**
WORDSTAR™	**6**
MEGAWRITER™	**7**
APPLE WRITER II™	**8**
PERFECT WRITER™	**9**
CORRESPONDENT™	**10**
SPELLBINDER™	**11**
MAGIC WINDOW II™	**12**
ZARDAX™	**13**
SUPERTEXT 40/80™	**14**
GUTENBERG™	**15**
WORD HANDLER™	**16**
SELECT™	**17**
SANDY™	**18**

Reviewed by John Martellaro, September 1983, based on Peelings II rating system for performance and performance to price ratio.

In the words of the Peelings II reviewer: *"This is the best program I have seen for people who do a lot of work with mailing lists, form letters and short correspondence."*

An easy to follow manual.
Essential to any good program is a manual that's clear and understandable. The Peelings II reviewer describes the Format II manual. *"All in all, it is one of the best word processor manuals I have seen. The latest documentation is a model of clarity and organization."*

Put it all together. Then add features such as support of hard disk drives and a standard DOS text file format compatible with spellers and communications programs, and it's not hard to see why Format-II has earned the number one rating.

The words of the Peelings II reviewer sum it up: *"I cannot think of another word processor that would be better overall for business use."*

Thanks Peelings II. We couldn't have said it better ourselves.

For a reprint of the full review, or to order Format-II, fill out coupon and send it to: Kensington Microware, Ltd. 251 Park Avenue South, NYC, NY 10010 or call us at (212) 475-5200. Tlx: 467383 KML NY. Or visit your local Apple dealer.

Format-II supports all printers.
Unlike other word processors, Format-II is compatible with *every* printer that works with the Apple, from the simplest dot matrix printer to the most advanced letter quality printer.

A built in mailing list at no extra cost!
Actually a database system resembling an index card file. A SORTING program will arrange the mailing list alphabetically or numerically. Powerful LOGIC commands merge specific entries into form letters and documents.

Please send (indicate quantity):

_____ Free reprint(s) of Peelings II review

_____ Format-II Word Processing Program(s) $150 each. Total $_____

_____ Apple II+ owners require keyboard mod. $5 each. Total $_____

On purchases add $2.50 shipping and handling $_____
New York State residents add applicable sales tax. $_____

☐ Check enclosed ☐ Visa ☐ Mastercard Total order $_____

Card No. Expires

Name on Card

Name

Address (UPS delivery)

City State Zip Phone

Kensington Microware, Ltd.
251 Park Avenue South
New York, NY 10010

KENSINGTON™ MICROWARE

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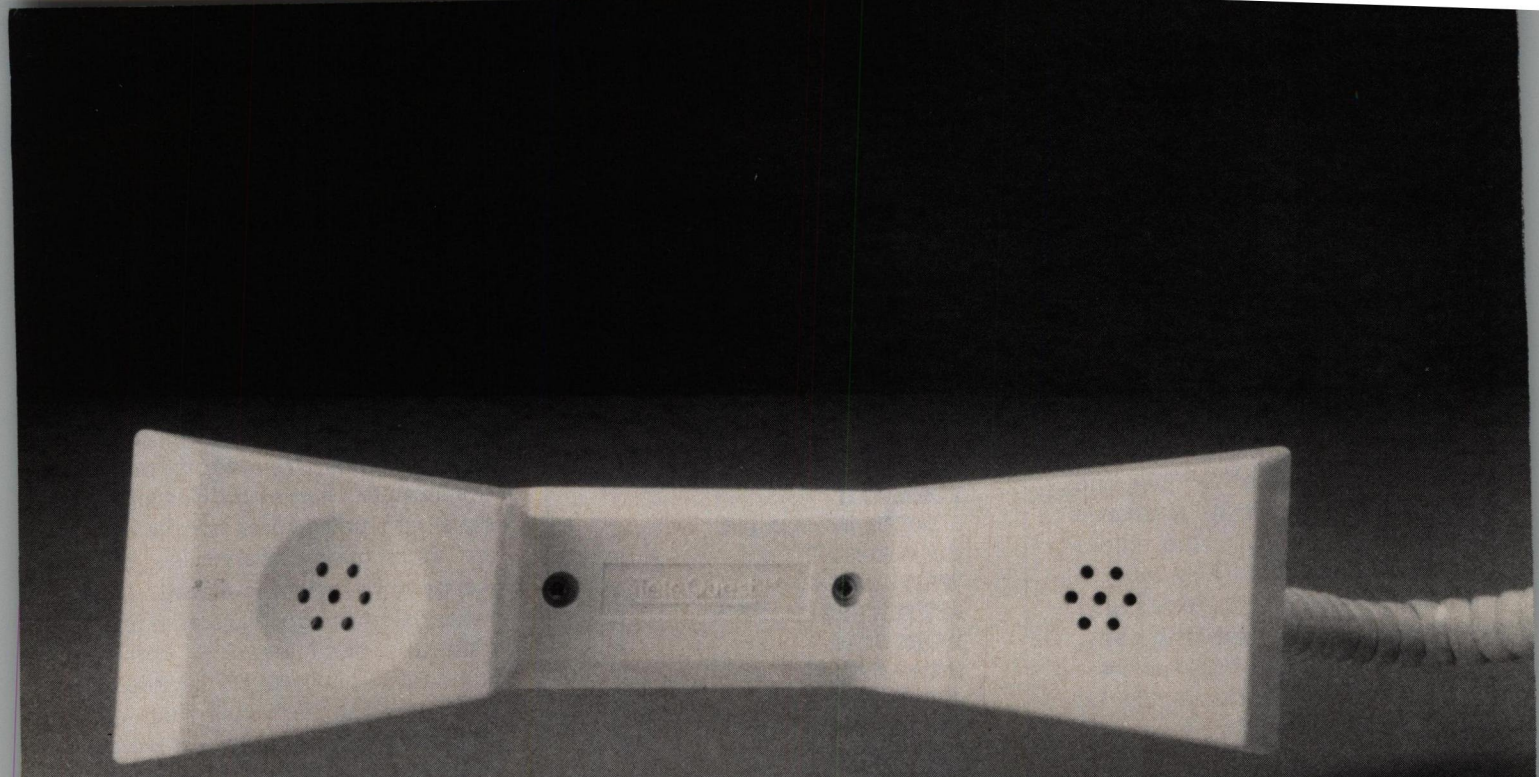
Format-II is a registered trademark of Kensington Microware Ltd.
Peelings II is a registered trademark of Peelings II, Inc.
Format-II requires 64K and an 80 column card.

CIRCLE 277 ON READER SERVICE CARD



APPLE MODEMS

DATA TRANSMISSION FOR ANY APPLE

Apple Computer has expanded its line of peripherals with the addition of two modems, the Apple Modem 300 and the Apple Modem 1200. The Apple Modem 300 is capable of transmission speeds of up to 300 bits per second (bps), and the more expensive Apple Modem 1200 can operate at speeds of up to 1200 bps. Both of these modems have optional accessory kits for all the Apple computers: Apple IIs, Apple IIIs, the Lisa, and the Macintosh.

One of the best features of the Apple modems is that they are software-compatible with the D. C. Hayes Smartmodems. Thus, much existing software works with these modems.

Installation is straightforward. If you are using an Apple II, II Plus, or IIe (the only Apples without a built-in serial port), you need a serial communications port on the computer, which you get by inserting a serial-interface card in slot 2. You can use non-Apple serial cards with these modems, but you need an Apple II Super Serial Card if you want to run the Apple Term communications program, which is part of the Apple II-series accessory kits. The Apple IIc, III, III Plus, Macintosh, and Lisa come equipped with serial-communications ports, so they don't require an additional serial card.

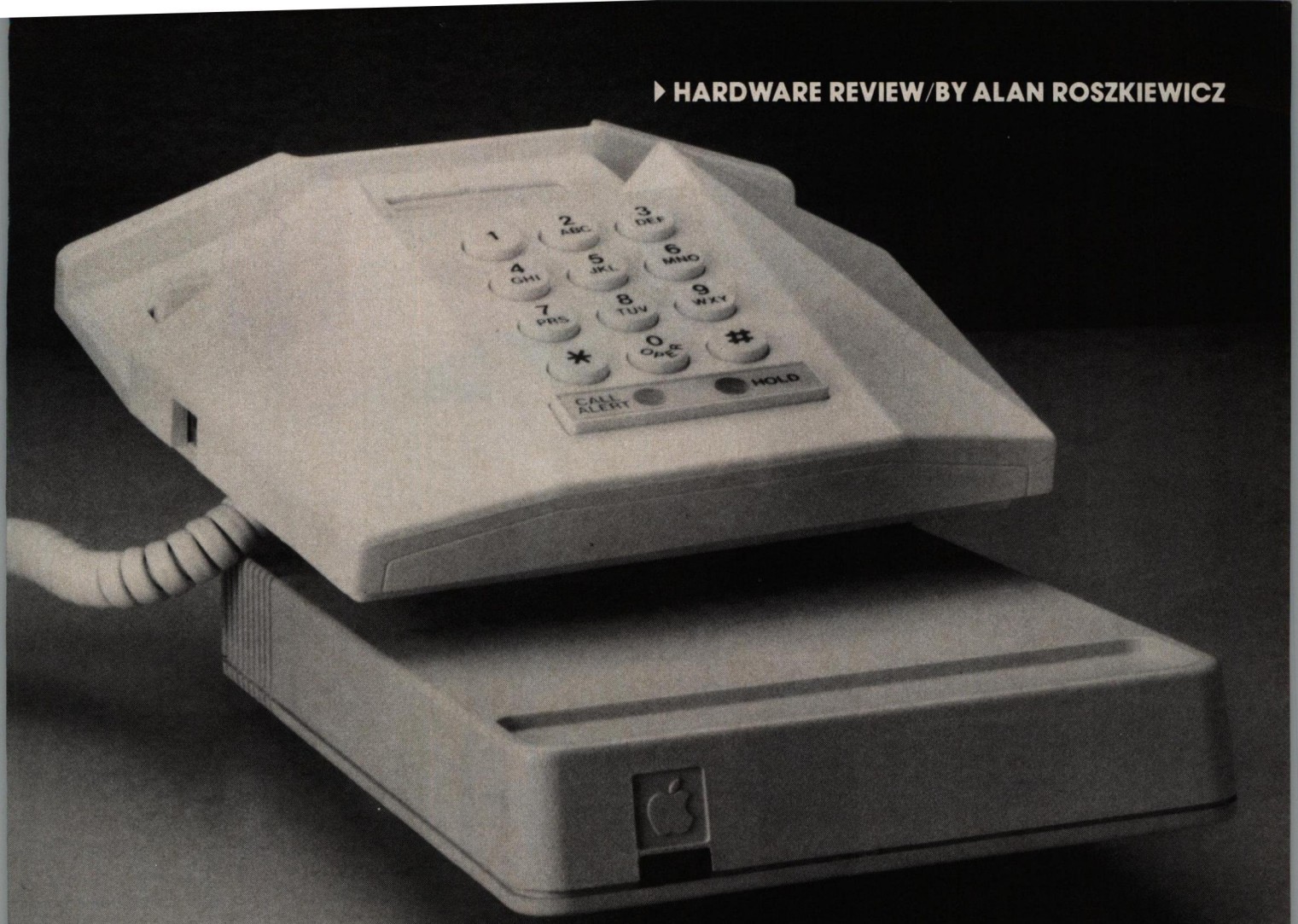
The next step is to plug one end of the provided cable into the computer and the other end into the modem. The connection to the computer's serial port uses a modified RS-232 cable that has a special 9-pin DB connector at the modem end of the cable. Cables for the II, II Plus, IIe, III, and Lisa have a standard DB-25 connector; cables for the IIc and Macintosh have special plugs designed to fit those computers' built-in serial ports.

If you're using an Apple II, II Plus, or IIe, the Apple Super Serial Card provides a standard 25-pin RS-232 DB connector at the interface end of the cable. First you have to plug the 9-pin connector of the modem's data cable into the back of the modem and fasten it into place by tightening the two small connector screws that prevent the cable from working loose.

For proper operation of the Apple Modem, make sure to set the Super Serial Card's jumper block with the triangular mark pointing to the word MODEM. Also, you must configure the selectable DIP switches on the Super Serial Card for operation with 1200 bps for the Apple Modem 1200 or with 300 bps for the Apple modem 300.

Connection to a telephone line is via a standard modular phone cable, which comes with the device. The Apple modems fit perfectly under a standard desk phone, and an additional plug at the rear of the modem lets you connect both the modem and the phone to the line at the same time. Although you can use only one at a time, having this additional telephone plug gives you the convenience of uninterrupted telephone service when the modem is off.

Connection to the power line is via a three-conductor cable from a power module that plugs into a standard wall outlet. This cable terminates with a soft rubber plug that inserts into the back of



the modem. In general, this connection scheme works well, but it would be preferable if the cable's connector were similar to the one on the Apple Mouse, which would allow you to remove the cable by unscrewing it by hand, rather than having to get behind the computer with a screwdriver.

Detachable Power Cord

Another failure of this design, the detachable power cord, brings back questions I had when reviewing other modems for *A+* (see the April 1984 issue). I thought a detachable power cord would be advantageous, insofar as it would facilitate equipment placement and arrangement. My experience with the Apple modems has not altered my belief in this design principle, but Apple's execution leaves something to be desired, since the connector plug is a bit too soft, which leads to difficulty in plugging in the modem. A hard plastic plug, the type you find on common calculators, would have been preferable.

The Apple Term Program

The modem's supplied communications program, Apple Term, is written in ProDOS, Apple's latest disk-operating system and the replacement for DOS 3.3. The program appears to have been designed to give modem buyers the ability to begin using the modem immediately. It is convenient and easy to use, but it is not a full-featured program.

A missing feature of the program is any file-handling capability. Apple Term gives you merely a taste of the modem's uses. Most users will need a good communications program with added features, something that can work with 80-column cards and non-Apple, standard interfaces and that can provide print and capture buffers to facilitate data transfer. A full-featured program such as Apple Access II would fill the bill.

Support

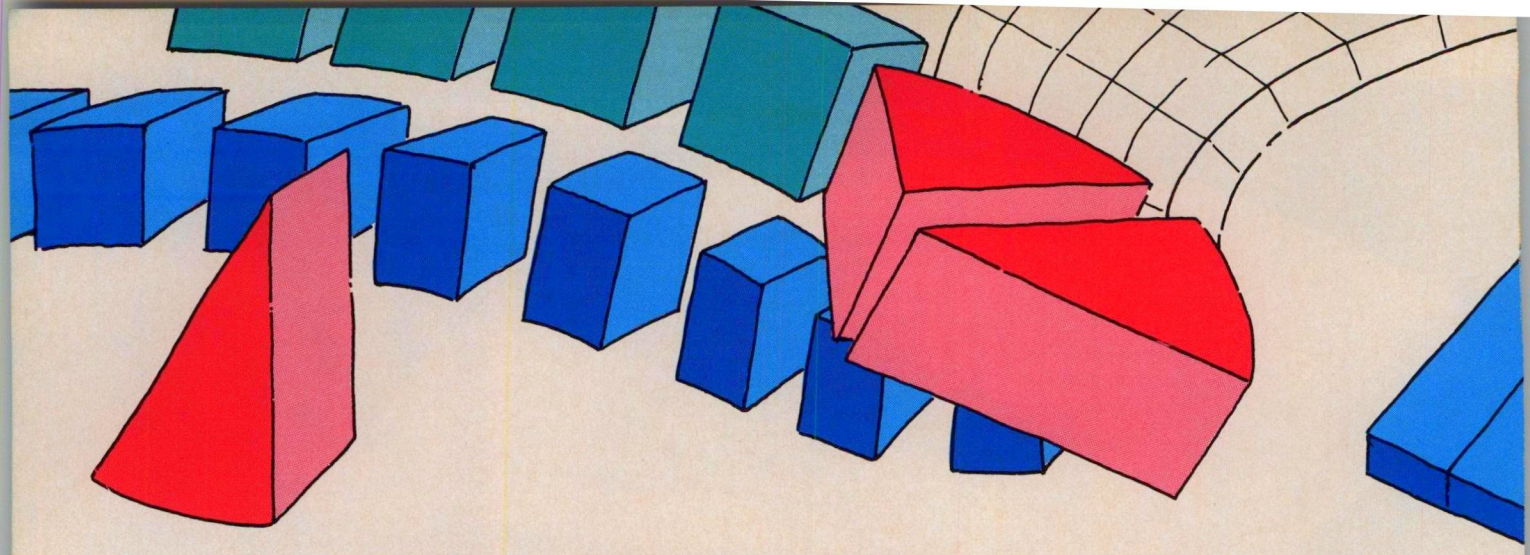
The new Apple modems represent Apple's entry into a new field and, as such, will most likely receive the full attention and support that Apple gives all of its products. ✚

▶ PRODUCT INFORMATION

Apple Modem 300 and 1200
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
List Price: Apple Modem 300, $225 ($299 with Modem Accessory Kit); Apple Modem 1200, $495 ($570 with Modem Accessory Kit)
Requires: Any Apple Computer, Apple Term communications program, Apple II Super Serial Card (for Apple II, II Plus, and IIe), 64K RAM, one disk drive, Language Card (Apple II only)

Apple Access II
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95104
(408) 996-1010
List Price: $75
Requires: Apple IIe or IIc, 64K RAM, one disk drive

LISA DEARING



▶ **SOFTWARE REVIEW/BY BYRON RYONO**

PFS:GRAPH

A BASIC, NO-NONSENSE TOOL FOR CREATING BAR, LINE, AND PIE CHARTS

In reports and presentations, bar charts, line charts, and pie charts are invaluable for comparing, contrasting, and finding trends in numerical or quantitative information. PFS:Graph is a basic, no-nonsense tool that creates charts on your Apple computer. For reports, you can print charts alone or merge them into text you've produced with PFS:Write, Software Publishing's word-processing software. For presentations, you can plot charts on overhead transparencies. If you have ever wished for an easy method to produce charts to enhance your communications, PFS:Graph may be the tool for you.

The ease of learning the procedure for designing a chart depends on your familiarity with chart jargon and components such as axes and data points. If you have worked with charts before, PFS:Graph is a simple tool to master; one quick perusal of the manual, and you will quickly understand the procedure for designing charts. If you are unfamiliar with charts, you must take the time to delve into the user manual, which is designed as a tutorial as well as a reference guide. The tutorial describes in detail the procedures for entering and retrieving data and defining, displaying, saving, printing, and plotting charts. Each procedure, which you request through menus, includes examples to follow.

Sampling the Fare

PFS:Graph comes with a diskette, called Sampler, that is filled with a wide variety of prepared charts, and the tutorial uses some of these charts in the examples. In addition to displaying each sample chart, you can see how its data is entered and how each is defined. Since you can print the chart's data with each chart, I recommend printing a copy of all the samples this way and collecting them in a notebook for use as a reference guide. Then, when you need to design a chart, simply peruse the notebook to find a chart that matches your need as closely as possible and copy it. As your chart-design collection grows, replace PFS:Graph's samples with your own, and you will soon have your own custom reference guide.

Designing Charts

You design charts in two major steps. First you enter or retrieve the data for your chart. Use your keyboard to enter a chart's data or retrieve data from VisiCalc or PFS files. Next, you define the characteristics of your chart (type of chart, titles, legends, and the like). You work with the same screen for defining every chart, regardless of its type—bar, line, or pie.

You build charts with x and y data. Bar and line charts plot x data on the horizontal or x-axis and y data on the vertical or y-axis. Pie charts use x data

MYRON GROSSMAN

M. GROSSMAN

to name each slice of the pie; y data determines the size of the slice.

PFS:Graph draws a graph on a chart. This use of the term *graph* is likely to puzzle experienced chart builders who are used to the term *variable*, but PFS:Graph does not use this term. A graph consists of one set of x and y data pairs. If you want to draw a second set of y values on the chart (draw two y variables but only one x variable), you specify a second graph, a second set of x and y data pairs. PFS:Graph allows you to draw up to four bar or line graphs on a single chart.

When you design a chart, the program temporarily stores all your work in a "scratchpad," which resides in your Apple's random-access memory. Thus, after you design a chart that you want to keep, you must be sure to save the chart on a diskette before turning off or rebooting your computer; otherwise, your chart will be lost. If you try to clear the scratchpad, the program will warn you about losing the chart and will give you a chance to change your mind.

Entering Data

You enter x and y data in pairs. Y data is always numeric values. X data, on the other hand, is a format, either a date format, a numeric format such as age group, or an identifier format that names a category of data.

When you enter your data, you must accurately specify your x-data format,

PFS:GRAPH ALLOWS YOU TO DRAW UP TO FOUR BAR OR LINE GRAPHS ON A SINGLE CHART.

because once you enter it into the scratchpad, the only way to change the format is the hard way. You must clear the scratchpad and, alas, enter your data all over again with the new x data format! On the other hand, you can edit the actual x and y values at any time.

When x data is a date, you specify the format as either a day, month, year, or quarter. You can combine month or quarter with year, but you can use the day format only by itself. Therefore, month and quarter data can span more than one year, but days cannot exceed one month on a chart.

Specifying the numeric x data format restricts you to building line charts only. You can enter numeric data as positive or negative numbers, decimal numbers, or numbers represented in scientific notation (e.g., 2E6 instead of 2,000,000). In fact, if you enter numeric data greater than 999,999 and later choose to edit it, PFS:Graph displays it in scientific notation, whether you like it or not.

With identifier x data, you can use a maximum of 15 characters to label each x value. Bar and line charts actually restrict you to fewer characters because of space limitations on the x-axis, so you should use abbreviations, if possible, to avoid truncation of your labels. With pie-chart x data, however, you don't have to be concerned about an actual x-axis, so you can take full advantage of the 15-character description length without worrying that the program will truncate your descriptions.

Sorting

PFS:Graph employs a sorting function whose actions depend on the type of chart you draw and the x-data format. On bar or line charts, it sorts x data in numeric format in numerical order, lowest to highest, and it sorts x data in date format in chronological order, earliest to most recent. So if your x data format is numeric or date, you can enter the data in any order, because the program sorts it for you. This function is particularly helpful if you need to add data in numeric or date format. Simply add it to the bottom of the current list of data, and the program automatically sorts it into its proper order.

Bar- or line-chart data in identifier format is a different, inconvenient situation, because the program cannot sort data for these types of charts. You must enter data in the order that you want the program to draw it. Any subsequent order changes or insertions require reentering all the data below the point of the change.

On pie charts, PFS:Graph sorts y data by quantity. The program draws pie charts from the smallest slice to the largest slice.

Data Reduction

The program reduces an x value that you enter or retrieve more than once on a graph to one x data entry with the y data summed into a single value. For instance, the program performs this data reduction when you retrieve data from VisiCalc or PFS files. Say you have stored shipping expenses by data during an entire year, but you want to graph those expenses by month. Since data reduction is available, you can specify month as the x-data format, and the program will tally all shipping-expense transactions for each month.

Data Points and Chart Types

Each x and y data pair counts as one "data point." A bar or line chart with a date or numeric x-data format holds a maximum of 36 data points per graph;

LINE CHARTS TAKE FULL ADVANTAGE OF THE MAXIMUM NUMBER OF DATA POINTS.

with an identifier x data format, the data-point maximum decreases to 16 per graph.

Line charts take full advantage of the maximum number of data points. You can draw four lines on one chart, each with 36 data points.

On bar charts, however, you can draw a maximum of 36 bars. If you define four bar graphs with ten data points each, PFS:Graph cannot draw the chart, because the resultant 40 bars exceed the limit. You can work around this restriction by choosing the Stack option. In our example, this option makes the program draw ten stacked bars with four bars, one from each graph, in each stack. Because stacked bar charts are appropriate only in certain situations, the stack option may or may not help you circumvent the 36-bar limit.

Pie charts have their own special data limitations. When you create pie charts, which require an identifier x-data format, you can enter up to eight data points (eight pie slices).

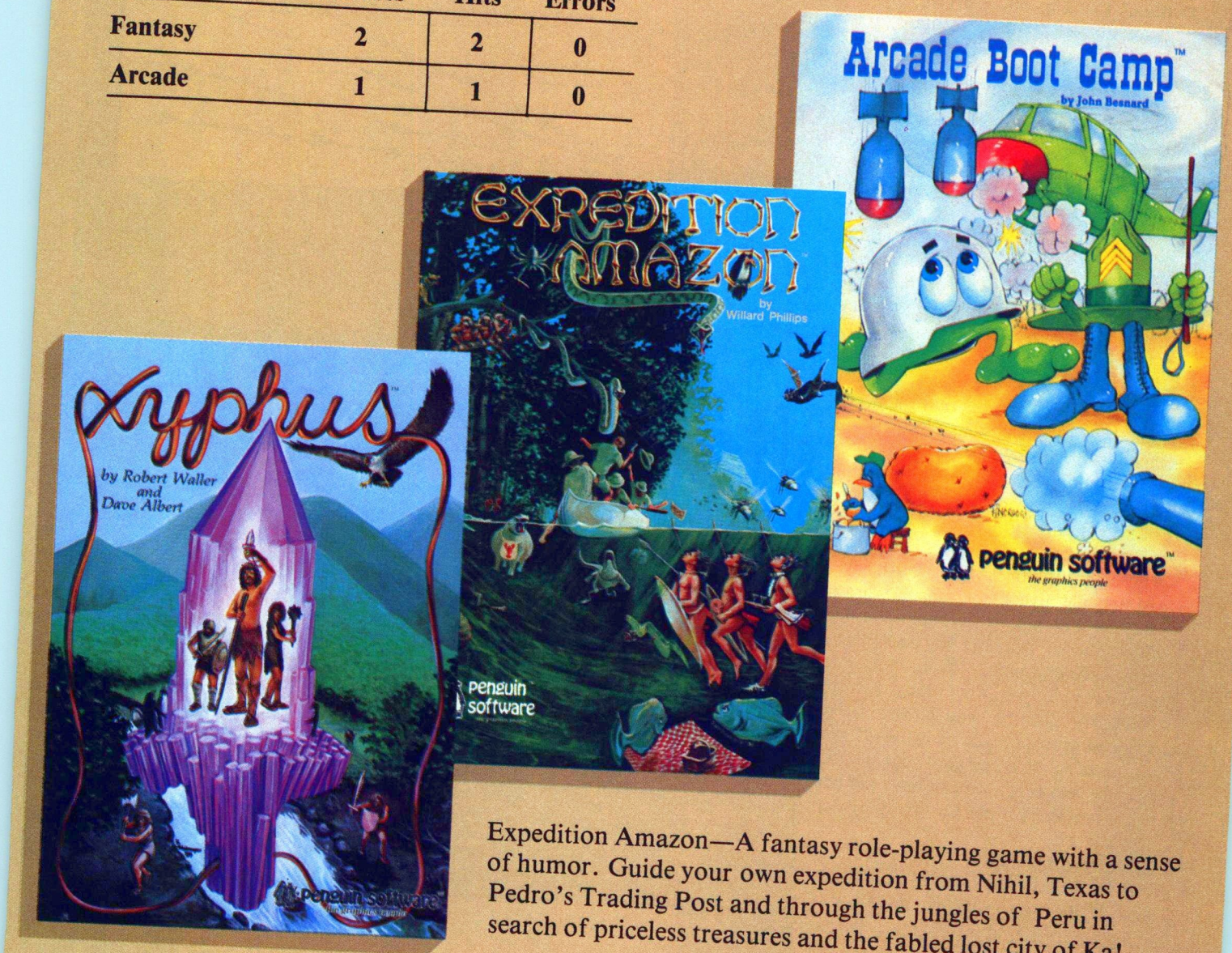
Retrieving Data

PFS:Graph's strongest feature is its ability to retrieve data from VisiCalc and PFS files. With VisiCalc files, you must first save the desired portion of your worksheet as a Data Interchange Format (DIF) file. You retrieve PFS files as is, and you can read data from all the forms in your PFS file or only selected forms, based on your retrieval specifications.

With both types of files, you specify the x-data format and the x and y data you want to retrieve. Since your data may be stored in more than one file, PFS:Graph allows you to perform more than one retrieval to merge data into one graph. After retrieving all the data you specify, the program performs data

Penguin Scores Again!

	Releases	Hits	Errors
Fantasy	2	2	0
Arcade	1	1	0



Expedition Amazon—A fantasy role-playing game with a sense of humor. Guide your own expedition from Nihil, Texas to Pedro's Trading Post and through the jungles of Peru in search of priceless treasures and the fabled lost city of Ka!

Arcade Boot Camp—Tired of getting 30 seconds of arcade play for your quarter? Face forward, Civilian, and march over to your dealer for this one. Train in five areas vital to arcade skills: Driving, Chopper Flying, Shooting, Jumping & Ducking, and Obstacle Course.

Xyphus—Explore the Lost Continent of Arroya as you develop a band of warriors and spellcasters in preparation for the final confrontation with Xyphus, Lord of Demons! This fantasy role-playing game features four-player independent movement and six separate scenarios, each set in a different region with different types of creatures, weapons, and spells. A true breakthrough in its genre, **Xyphus** is destined to become a classic.

penguin software™
the graphics people

830 Fourth Ave.
P.O. Box 311
Geneva, IL 60134
(312) 232-1984

CIRCLE 133 ON READER SERVICE CARD

Expedition Amazon, Arcade Boot Camp, Xyphus, and Penguin Software are trademarks of Penguin Software, Inc.

reduction and sorting, as appropriate. At this point, if you have exceeded the maximum allowable number of data points, the program will tell you that the chart is full. It does not keep any data beyond the limit.

Defining, Printing, and Plotting

Once all your data is in place, you define the chart type. At the same time, you can specify legend labels, a chart title, and x- and y-axis titles. Also, you specify options such as grid lines and y-axis scaling here.

Now display your chart. If your chart definition doesn't suit you, change the chart (within PFS:Graph's data-format and data-point limitations). Feel free to experiment. First try a bar chart; then see what it looks like as a line chart or combine bars and lines on the same chart. Change the title, tighten the y-axis scaling, or add more grid lines. The program lets you edit at any time. When you're done, be sure to save your chart—up to 45 charts fit on one diskette.

When you're ready to commit your graph to paper, printing and plotting are no-nonsense functions. PFS:Graph prints and plots on a range of popular printers and plotters. For printing, you can specify either the normal graph size, 3 × 4 inches, or the expanded size, which rotates the chart 90° and fills an 8½ × 11-inch page. You can also choose to print your data along with the chart. For plotting, you choose either paper or transparency plotting. If you are plotting in color and your plotter has only two pens, you can have the pen pause between graphs for changing pen colors.

All the Fundamentals

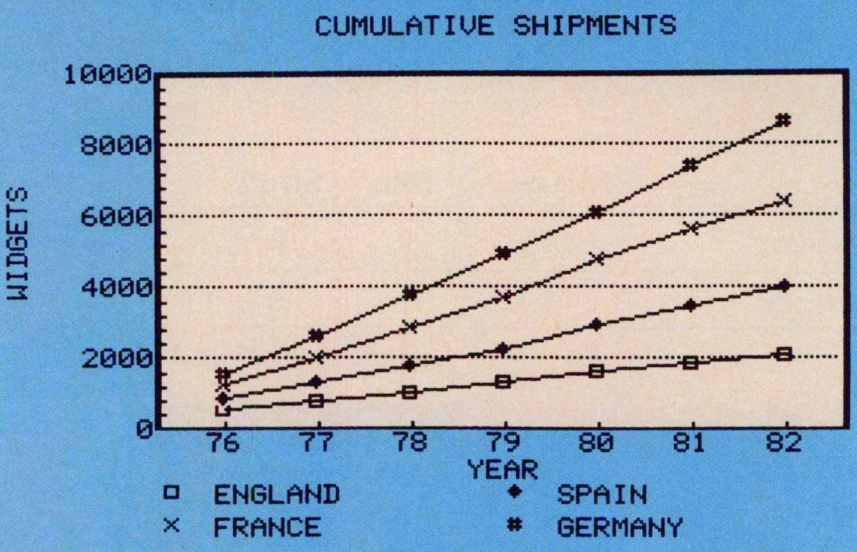
PFS:Graph offers all the fundamentals you'd expect of a basic tool for creating bar, line, and pie charts. It is easy to learn and simple to use. If you include charts in your reports and presentations, and especially if your data comes primarily from VisiCalc or PFS files, PFS:Graph deserves your attention. +

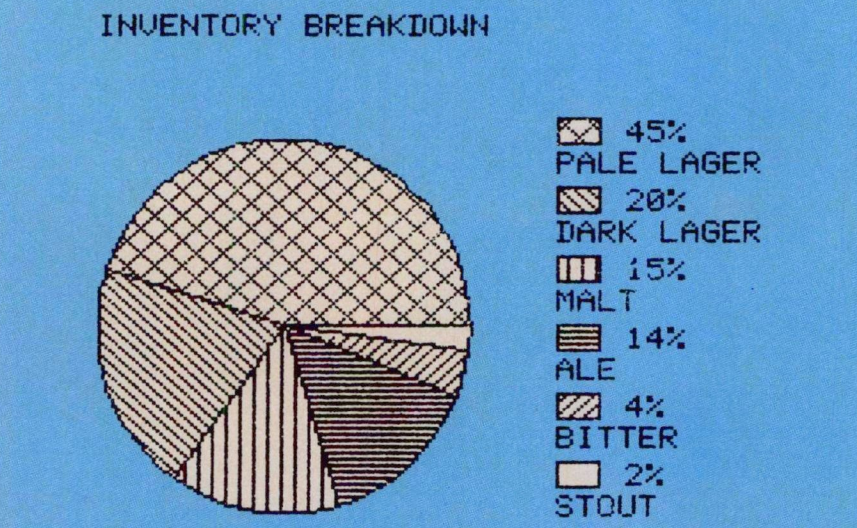
▶ PRODUCT INFORMATION

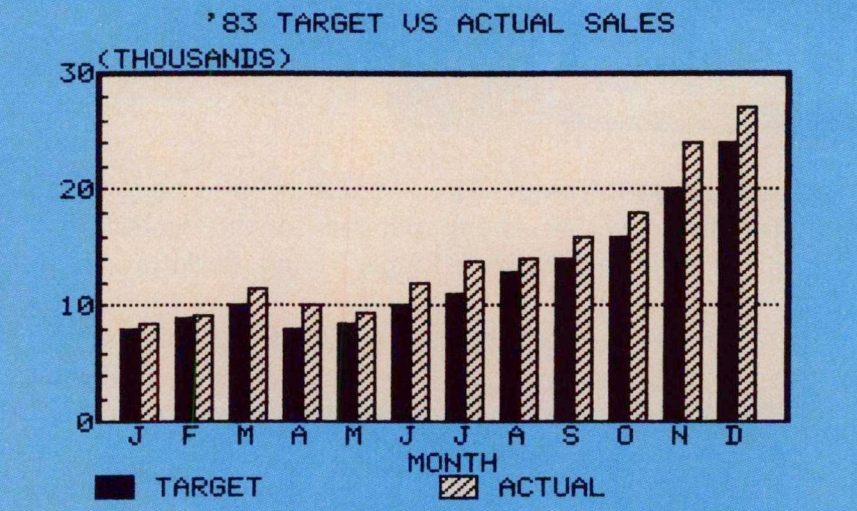
PFS:Graph
Software Publishing Corporation
1901 Landings Drive
Mountain View, CA 94043
(415) 962-8910

List Price: $125 each for the Apple II, II Plus, and IIe; $175 for the Apple III

Requires: Apple II, II Plus, IIe, or III; 64K RAM; one disk drive

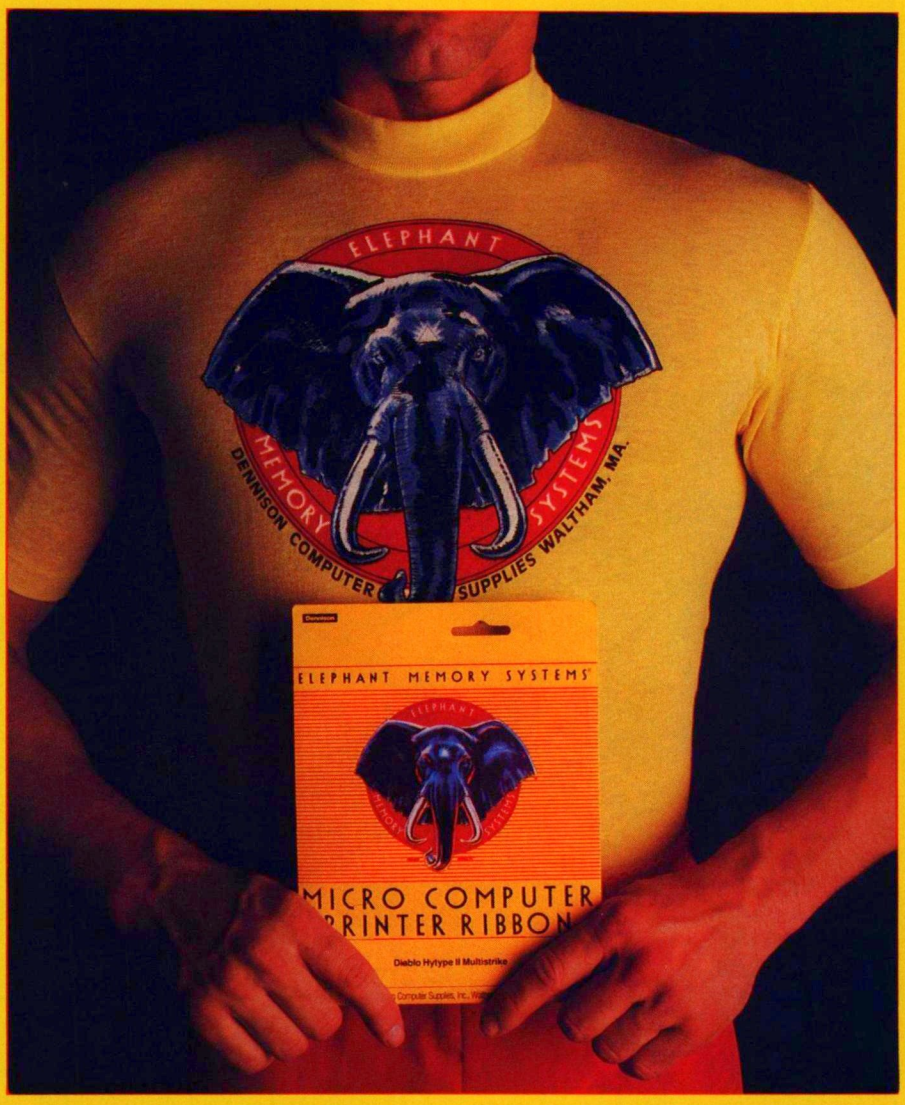






You can draw four lines on one line chart (top), each with 36 data points. When you create pie charts (middle), you can enter up to eight data points (slices). On bar charts (bottom), you can draw a maximum of 36 bars.

"T" FOR TWO.



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To introduce you to our new Elephant Memory Systems™ Ribbons, we're offering our unique Elephant T-shirt for just $2. Send in your proof of purchase along with the attached coupon and $2. We think you'll find our durable, high quality Ribbons will make your PC's printing look better than ever. And with our Elephant T-shirt, so will you. For the Elephant Ribbons dealer nearest you, call 1-800-343-8413. In Massachusetts, call collect (617) 769-8150.

Dennison

ELEPHANT™ NEVER FORGETS.

CIRCLE 102 ON READER SERVICE CARD

Mail this coupon and $2.00 (check or money order, payable to Dennison Computer Supplies, Inc.) plus proof of purchase of Elephant Memory Systems™ ribbons (serial number from the package and your cash register receipt with the purchase price circled).

To: Dennison Computer Supplies, Inc./T-Shirt Offer
320 Norwood Park South
Norwood, MA. 02062

Check size: ☐ small ☐ medium ☐ large ☐ x-large

Name _____
(Please print)

Address _____

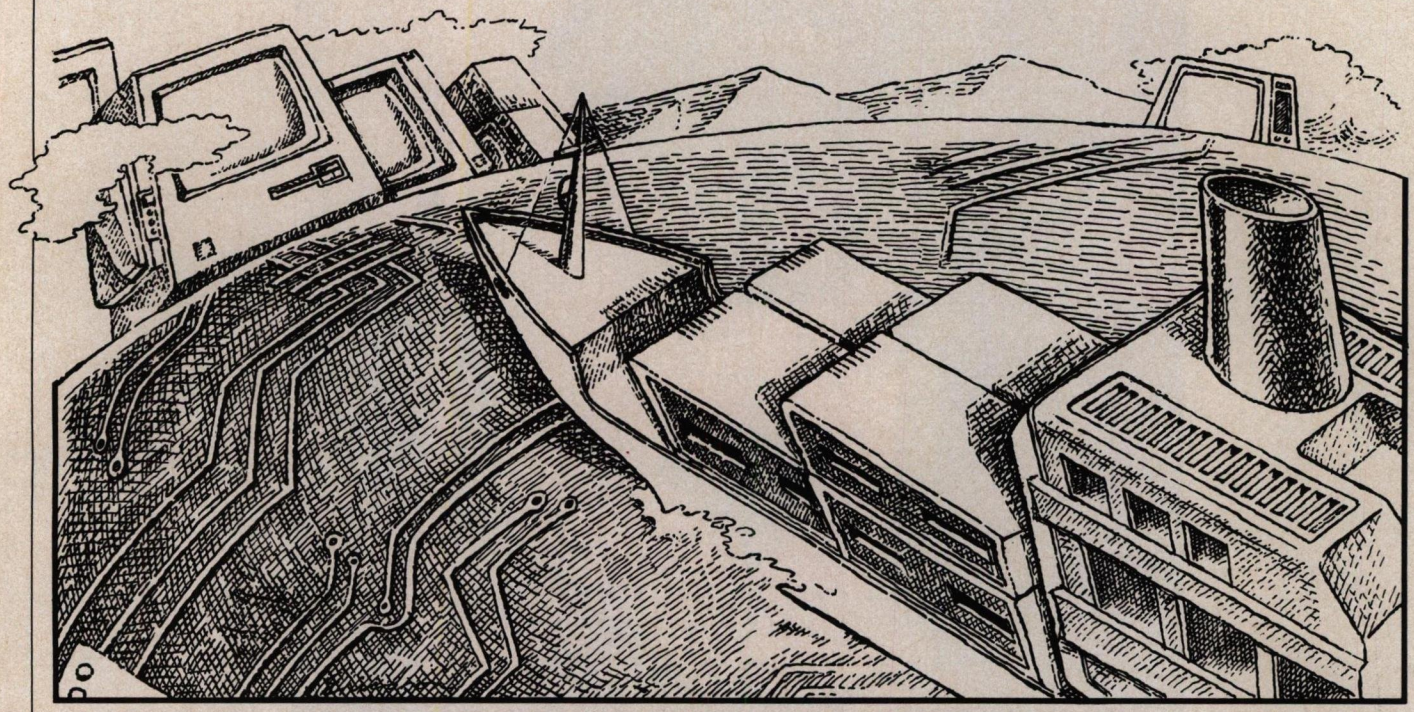
City _____

State _____ Zip _____

Offer good in U.S.A. only, except where prohibited or taxed or otherwise restricted by law. Offer expires September 30, 1984. Allow 6 to 8 weeks for delivery. One order per envelope. Offer good while supply lasts.

A+-8/84

TELECOMMUNICATIONS
BY RUSS LOCKWOOD
Specialized databases for information-hungry consumers



JOBS, SOFTWARE, SHIPPING NEWS

As the telecommunications industry expands, finding important information becomes easier. Companies identify a need, create specialized databases, and offer their services to information-hungry consumers.

Consumers discover that the information they want is no further away than their Apple. They can download articles to a printer or store statistics on disk. Telecommunications decreases the need to stalk library stacks and increases the speed and convenience of gathering information. It also means spending money—up to $300 per hour for some services.

Two companies, The Copley Press, Inc., and Searchmart Corporation, have adopted an unusual payment strategy by charging suppliers rather than consumers and are thus carving a unique niche in the telecommunications marketplace.

Another company, Maritime Data Network Ltd., pursues a more traditional pricing approach and is the leading on-line database covering the marine shipping industry.

Consumers discover that the information they want is no further away than their Apple.

CLEO

CLEO (Computer Listings of Employment Opportunities) is an electronic help-wanted classified-advertising service published by The Copley Press.

CLEO posts high-technology jobs for technical professionals. Computer programmers, system managers, engineers, and software-documentation editors are some of the people who find CLEO helpful in their quest for a new position.

CLEO is easier to use than many other telecommunications services are. It does not require any passwords, identification numbers, or any log-on procedure. You dial one of the special telephone numbers matching the transmission rate of your modem, press the Return key twice, and you are on.

As with most services, CLEO uses a menu-driven format. As with a newspaper classified section, you first pick a

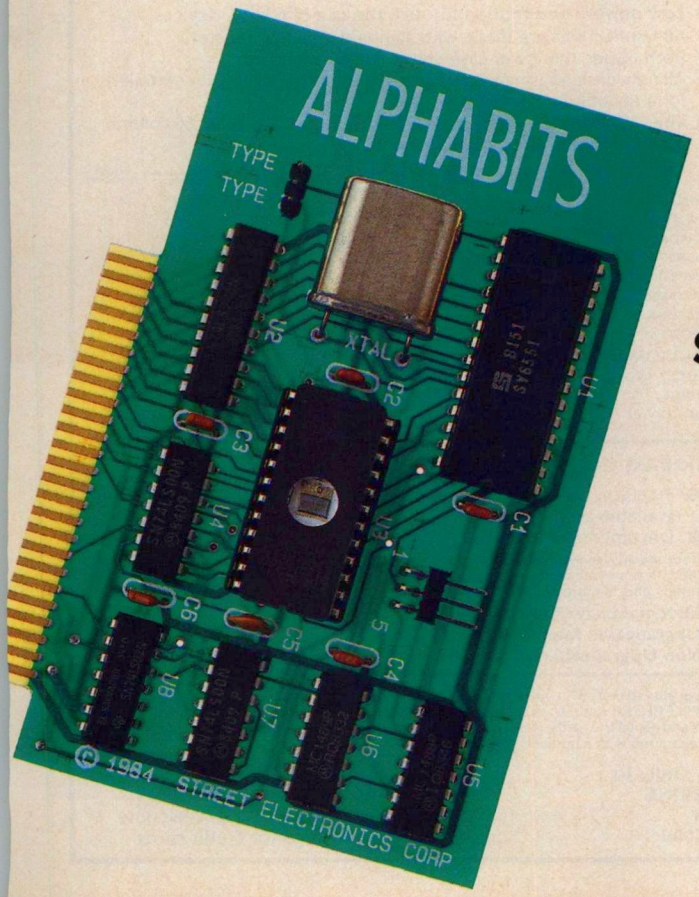
CELESTE ERICSSON

The Alphabits™ serial interface:
New Interface Standard

Street Electronics set the design standard for parallel printer interfaces nearly three years ago when they designed the GRAPPLER™.

The new ALPHABITS™ serial interface will soon establish a new standard for serial interfaces with bundled software. This new plug-in product for the Apple® II series, which was introduced at the "Apple II Forever Expo," emulates the new Apple IIc serial ports. Now Apple II series users can run software and peripherals designed for the IIc.

A hi-res graphics screen printing package with mouse interfacing capabilities is included, as is a IIc compatible connector. The ALPHABITS™ was especially designed as a low-cost product for the increasing number of quality serial printers like the Apple Imagewriter™.



Street Electronics Corporation

1140 Mark Avenue
Carpinteria, CA 93013 California
Telephone (805) 684-4593

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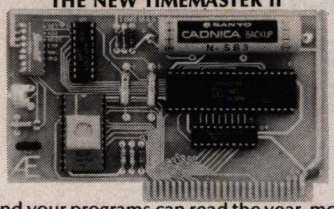
Imagewriter™ is a trademark of Apple Computer, Inc.
Grappler™ is a trademark of Orange Micro, Inc.

Apple Peripherals Are All We Make
That's Why We're So Good At It!

THE NEW TIMEMASTER II

Automatically date stamps files with PRO-DOS



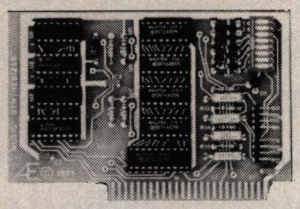
NEW 1984 DESIGN
An official PRO-DOS Clock

- Just plug it in and your programs can read the year, month, date, day, and time to 1 millisecond! The only clock with both year and ms.
- NiCad battery keeps the TIMEMASTER II running for over ten years.
- Full emulation of ALL other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the TIMEMASTER to emulate other clocks, we just drop off features. That's why we can emulate others, but others CAN'T emulate us.
- The TIMEMASTER II will automatically emulate the correct clock card for the software you're using. You can also give the TIMEMASTER II a simple command to tell it which clock to emulate (but you'll like the Timemaster mode better). This is great for writing programs for those poor unfortunates that bought some other clock card.
- Basic, Machine Code, CP/M and Pascal software on 2 disks!
- Eight software controlled interrupts so you can execute two programs at the same time (many examples are included).
- On-board timer lets you time any interval up to 48 days long down to the nearest millisecond.

The TIMEMASTER II includes 2 disks with some really fantastic time oriented programs (over 40) including appointment book so you'll never forget to do anything again. Enter your appointments up to a year in advance then forget them. Plus DOS dater so it will automatically add the date when disk files are created or modified. The disk is over a $200.00 value alone—we give the software others sell. All software packages for business, data base management and communications are made to read the TIMEMASTER II. If you want the most powerful and the easiest to use clock for your Apple, you want a TIMEMASTER II.

PRICE $129.00

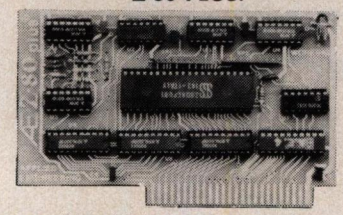
Super Music Synthesizer
Improved Hardware and Software



- Complete 16 voice music synthesizer on one card. Just plug it into your Apple, connect the audio cable (supplied) to your stereo, boot the disk supplied and you are ready to input and play songs.
- It's easy to program music with our compose software. You will start right away at inputting your favorite songs. The Hi-Res screen shows what you have entered in standard sheet music format.
- Now with new improved software for the easiest and the fastest music input system available anywhere.
- We give you lots of software. In addition to Compose and Play programs, 2 disks are filled with over 30 songs ready to play.
- Easy to program in Basic to generate complex sound effects. Now your games can have explosions, phaser zaps, train whistles, death cries. You name it, this card can do it.
- Four white noise generators which are great for sound effects.
- Plays music in true stereo as well as true discrete quadraphonic.
- Full control of attack, volume, decay, sustain and release.
- Will play songs written for ALF synthesizer (ALF software will not take advantage of all our card's features. Their software sounds the same in our synthesizer.)
- Our card will play notes from 30HZ to beyond human hearing.
- Automatic shutoff on power-up or if reset is pushed.
- Many many more features.

PRICE $159.00

Z-80 PLUS!



- TOTALLY compatible with ALL CP/M software.
- The only Z-80 card with a special 2K "CP/M detector" chip.
- Fully compatible with microsoft disks (no pre-boot required).
- Specifically designed for high speed operation in the Apple IIe (runs just as fast in the II+ and Franklin).
- Runs WORD STAR, dBASE II, COBOL-80, FORTRAN-80, PEACHTREE and ALL other CP/M software with no pre-boot.
- A semi-custom I.C. and a low parts count allows the Z-80 Plus to fly thru CP/M programs at a very low power level. (We use the Z-80A at fast 4MHZ.)
- Does EVERYTHING the other Z-80 boards do, plus Z-80 interrupts.

Don't confuse the Z-80 Plus with crude copies of the microsoft card. The Z-80 Plus employs a much more sophisticated and reliable design. With the Z-80 Plus you can access the largest body of software in existence. Two computers in one and the advantages of both, all at an unbelievably low price.

PRICE $139.00

Viewmaster 80

There used to be about a dozen 80 column cards for the Apple, now there's only ONE.

- TOTALLY Videx Compatible.
- 80 characters by 24 lines, with a sharp 7x9 dot matrix.
- On-board 40/80 soft video switch with manual 40 column override
- Fully compatible with ALL Apple languages and software—there are NO exceptions.
- Low power consumption through the use of CMOS devices.
- All connections are made with standard video connectors.
- Both upper and lower case characters are standard.
- All new design (using a new Microprocessor based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

	PRICE	BUILT IN SOFTSWITCH	SHIFT KEY SUPPORT	LOW POWER DESIGN	80 COLUMN HOME	7x9 DOT MATRIX	LIGHT PEN INPUTS	40 COLUMN OVERRIDE	INVERSE CHARACTERS
VIEWMASTER	**179**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
SUP'RTERM	MORE	NO	YES	NO	NO	NO	NO	YES	YES
WIZARD80	MORE	NO	NO	NO	NO	YES	NO	YES	YES
VISION80	MORE	YES	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	YES	NO	NO	NO	NO	YES	YES
VIEWMAX80	MORE	YES	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

PRICE $179.00

MemoryMaster IIe 128K RAM Card

- Expands your Apple IIe to 192K memory.
- Provides an 80 column text display.
- Compatible with all Apple IIe 80 column and extended 80 column card software (same physical size as Apple's 64K card).
- Can be used as a solid state disk drive to make your programs run up to 20 times FASTER (the 64K configuration will act as half a drive).
- Permits your IIe to use the new double high resolution graphics.
- Automatically expands Visicalc to 95 K storage in 80 columns! The 64K config. is all that's needed, 128K can take you even higher.
- PRO-DOS will use the MemoryMaster IIe as a high speed disk drive.
- Precision software disk emulation for Basic, Pascal and CP/M is available at a very low cost. NOT copy protected.
- Documentation included, we show you how to use all 192K.

If you already have Apple's 64K card, just order the MEMORYMASTER IIe with 64K and use the 64K from your old board to give you a full 128K. (The board is fully socketed so you simply plug in more chips.)

MemoryMaster IIe with 128K	**$249**
Upgradeable MemoryMaster IIe with 64K	**$169**
Non-Upgradeable MemoryMaster IIe with 64K	**$149**

Our boards are far superior to most of the consumer electronics made today. All I.C.'s are in high quality sockets with mil-spec. components used throughout. P.C. boards are glass-epoxy with gold contacts. Made in America to be the best in the world. All products work in the APPLE IIE, II, II+ and Franklin. The MemoryMaster IIe is IIe only. Applied Engineering also manufactures a full line of data acquisition and control products for the Apple; A/D converters and digital I/O cards, etc. Please call for more information. All our products are fully tested with complete documentation and available for immediate delivery. All products are guaranteed with a no hassle **THREE YEAR WARRANTY.**

Texas Residents Add 5% Sales Tax
Add $10.00 If Outside U.S.A.
Dealer Inquiries Welcome

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Carrollton, TX 75006

Call (214) 492-2027
8 a.m. to 11 p.m. 7 days a week
MasterCard, Visa & C.O.D. Welcome
No extra charge for credit cards

job category to look at, and then you see a list of all job titles. You choose a title, such as Programmer, and page through the ads.

Electronic Ads

Certain job titles hold more ads than others. For instance, Programmers holds so many that the title breaks down into two sections—Programmers A-P and Programmers Q-Z.

Each ad usually consists of 32 lines of copy divided into three screens. Each line is 32 characters long, so if your computer connects to a television, each line fits across the width of the screen. Unlike a newspaper, which places ads next to each other, CLEO displays only one ad at a time.

CLEO lets you use two search options to save time and effort. The first allows you to narrow your search by company, location, or combination of both. The second option provides an even more specific search using keywords. You enter descriptive words—for example, *avionics*,—and CLEO retrieves those advertisements with matching words. You must be careful entering the keywords because some companies may not use the specific terms you enter: you might enter the word *avionics* but miss listings for *aviation electronics*, or even *radar*.

CLEO also usually lists a company profile at the end of the ad. This contains company history, goals, achievements, a person to contact regarding the job, and anything else the company wishes to include.

Perhaps the best aspect of CLEO is the ability to apply for a job right at your terminal. You fill out a miniapplication consisting of your name, address, phone number, and present occupation. CLEO then forwards your application to the company.

Perhaps the best aspect of CLEO is the ability to apply for a job right at your terminal.

CLEO operates out of California, so almost all of the listed jobs are located in that state. CLEO does plan to expand its focus to include more jobs in other areas of the country. If you intend to move to the West Coast, CLEO is a good place to start to look for a technical position. Ads are updated daily.

CLEO takes the novel approach of charging the suppliers rather than the users. Thus, job seekers can access CLEO for the price of a phone call.

The cost to companies is proportional to the frequency of advertising. One three-screen ad in each calendar month costs $35.22 per day. Placing 240 or more ads costs $10.38 per ad per day. The cost drops even more if the company advertises heavily under a contract with CLEO. For example, 600 or more ads in each calendar month cost $4.98 per ad per day.

Other services carry additional charges. Extra screens cost $11.74 each per day for one noncontract ad per calendar month, and they drop to $1.66 per screen per day under the contract rate for 600 or more ads per month. Box numbers are $20, miniapplications are $5 per month, and an ad with graphics is $15.

ON-LINE SOFTWARE LIBRARY

Searchmart Corporation introduces a new concept in marketing software, the On-Line Software Library. This database lists, describes, and demonstrates tens of thousands of individual applications and systems-software packages right on your Apple.

NOW . . . APPLE IMAGEWRITER* COMPATIBLE!

From Screen to Paper *at the Touch of a Button*

SERIAL AND PARALLEL

The new Apple* - compatible ~~parallel~~ printer interface card from Texprint is the ONLY way to get fast, easy printouts of ANY screen, at ANY time, with ANY program – in color and black & white.

Push the red button that comes with PRINT-IT!˜ – Your program pauses instantly: touch RETURN and whatever is on your screen – text, graphics or both – is printed in color or black & white.

Whether your Apple II, II+, //e or "look-alike" is for business or pleasure, you'll want the ability to pause and take snapshots of your screen displays and then continue from exactly where you paused, all at the touch of a button – games, business data, menus, educational instructions, graphics – even CP/M**. PRINT-IT!˜ will print your screen at any time no matter what program you're running, as well as perform every function you expect of an intelligent printer card.

PRINT-IT!˜ supports:

- Graphics – Low, high, double low, and double high resolution
- Text – 40 column as well as Apple //e and Videx*** 80 column cards
- Printers – All of the most popular printers, including color, are easily selected with a dip switch

PRINT-IT!˜ is available at your local computer store now! If they don't have it in stock, ask them to get it for you.

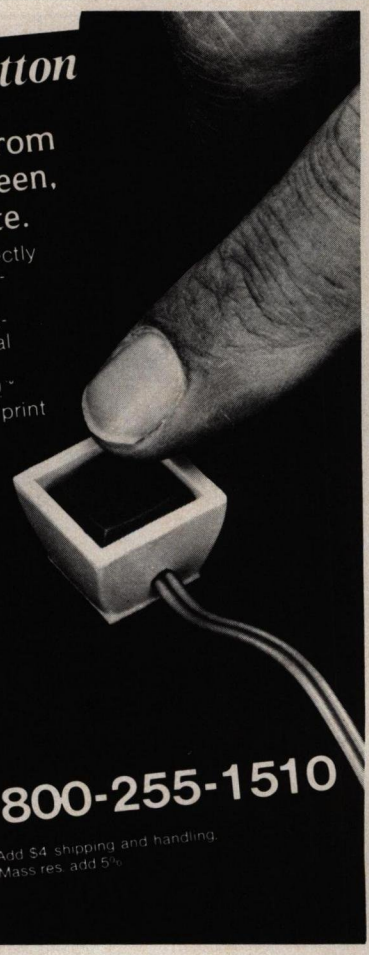
PRINT-IT!˜ is also available for $199 directly from Texprint with an unconditional money-back guarantee. Just return it in good condition within 30 days of purchase, postpaid, for a full refund. Qualified educational and dealer discounts available.

Texprint's Model 2 (with most PRINT-IT!˜ functions, except the push button pause/print feature) is the next best printer interface available anywhere, and for only $149.

* Apple Computer
** Digital Research
*** Videx, Inc.

TEXPRINT

Subsidiary of Computer Products Inc.
220 Reservoir Street
Needham Heights, MA 02194
Tel. (617) 449-5808



To Order

Call Toll Free 1-800-255-1510

Add $4 shipping and handling.
Mass res. add 5%

Not all of these packages are for the Apple. The Library also lists programs for IBM, Atari, Commodore, and other computers, including a section for Apple-compatibles. On the other hand, you can compare the huge selection of Apple software with packages for other computers to get an idea of what is available in the marketplace.

Searchmart did a fine job of breaking down software into 15 major categories: Accounting, Amusement/Games, Banking/Trust Services, Business (General), Business (Specific), CAD/CAM, Communications/Graphics, Database/Record Keeping, Education, Financial Management/Taxes, Home and Personal, Insurance, Manufacturing/Construction, Professional Practice, and Science/Statistics/Mathematics.

These 15 categories break down further into 154 subcategories. For example, Business (Specific) holds 20 industry subcategories, from Agriculture to Utilities. Home and Personal holds a dozen, from Astrology to Stock Market Systems. Other subcategories include Word Processing, Spreadsheets, Database Management, Adventure Games, and Statistical Analysis.

The first time you sign on to the Library, you enter your name, address, and telephone number. Every subsequent visit requires only your telephone number.

The Library uses a menu-driven format, from which you choose a computer system, operating system, category, and subcategory. Programs that meet your specifications then appear on the screen.

Each listing displays at least one screen of key characteristics. You see the program name, application, additional hardware, language used, operating-system requirements, memory and system-configuration requirements, list price, and the manufacturer's name and address.

You can compare the huge selection of Apple software with packages for other computers to get an idea of what is available.

Additional screens hold whatever the manufacturer wants, including detailed program description, company profile, and accepted form of payment.

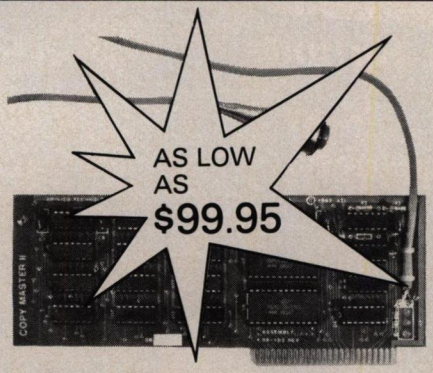
Perhaps the best part of the Library is that you can get a demonstration of a program, providing the manufacturer placed one in the database. Demonstrations are not available for all software, though, since telecommunications transmissions are limited to alphanumeric characters, but most nongraphics software uses only alphanumeric characters.

Searchmart does not stop at demonstrating the programs. The company plans to include an electronic-mail service that allows you to contact the manufacturer directly to ask for additional information or to send comments.

The Library also provides a separate section for new products. This New Software Product File lists software packages introduced within the last three months. When the time expires, manufacturers have the option to move the description into the regular database.

Searchmart charges the software manufacturer, not the consumer. Calling up the Library is free, except for the price of the telephone call.

For the manufacturers, each 20-line by 40-character screen costs $300 per year. Volume discounts are available.



Why buy an outdated copy system that will drive you Wild when you can get

COPY MASTER II

It is the only copy system that is easy enough to be used by a novice and yet with software options to satisfy even the most sophisticated programmer.

NOW TWO SYSTEMS IN ONE:

- **Back-up 64K & 128K protected software**
- **Print text and graphics screens of protected (watch out Grappler!) as well as unprotected software**

★ **COPY MASTER II** makes back-up copies of all memory resident software, at the press of a button. The copy produced is unprotected and can be loaded back into memory with standard DOS commands.
★ Previously hidden code becomes accessible and subject to change or study.
★ Freeze games and then restart them days later. Or save the winning display on disk.
★ Single-step and trace through any program.
★ The **COPY MASTER II** set comes complete with plug-in, slot-independent board, software and manual. **Unlike some copy boards, there is no extra utility software or expensive EPROM to buy.** There are no chips to pull.
★ Minimum System Requirements: Apple II Plus, or an Apple IIe, 1 disk drive and DOS 3.3
★ 64K copy is made in less than 20 seconds, 128K in less than 30 seconds.
★ Special utility program allows the copies to run without a copy board.
★ The Print Screen option produces a hard copy of text, graphics or mixed display for all software (protected or not) at the push of a button. (Epson MF/FX or a compatible printer is needed.)

64K copy system: $99.95 128K copy system: $119.95
For Print Screen option add $15

Send check or money order for the full amount plus $5 shipping and handling (Calif. residents please add 6% (L.A. County 6½%) Calif. Sales Tax) to:

APPLIED TECHNOLOGY LABORATORIES
11926 Santa Monica Boulevard
Los Angeles, California 90025
(213) 477-6815

(Please specify computer and printer type when ordering)

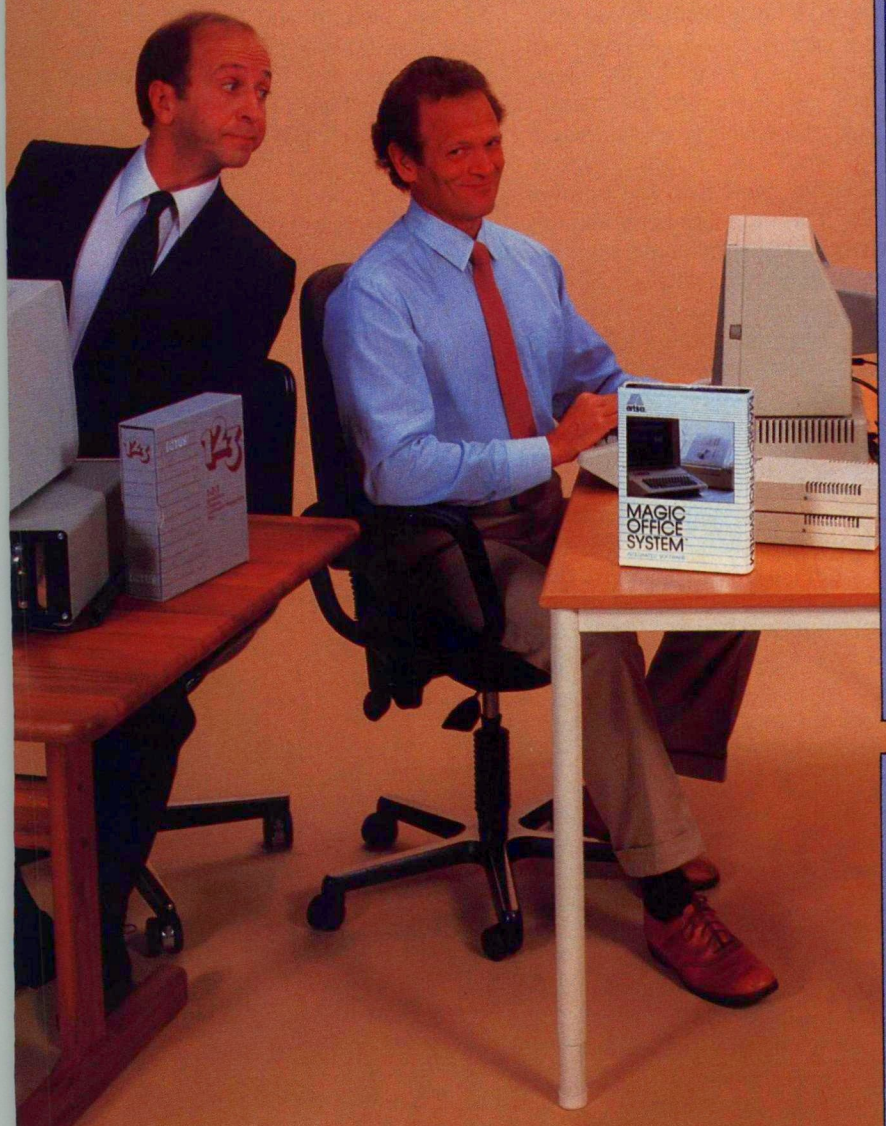
Important Notice: COPY MASTER II has many uses. However, **THE COPYING ABILITIES OF COPY MASTER II SHOULD BE USED SOLELY FOR ARCHIVAL PURPOSES.** Any other copying use may be illegal.

TRADEMARKS: Apple II, Apple II Plus and Apple IIe are trademarks of Apple Computer, Inc.
Locksmith and Nibbles Away are trademarks of Omega Microware, Inc. and Computer applications respectively.
Grappler is a trademark of Orange Micro.

CIRCLE 266 ON READER SERVICE CARD

Apple owners shouldn't be jealous of integrated software like Lotus 1-2-3.

Now you can have something better. Magic Office System.™



Now you can have four of the most powerful programs for the Apple IIe and Apple IIc computers—all in one fully integrated package.

You'll be able to quickly and easily produce letters and reports—complete with spreadsheets and graphics interspersed—with every word spelled correctly.

Using one disk. No shuffle.

WORD PROCESSING: you'll have a greatly enhanced version of an already popular program for creating and editing any kind of document. Printing and formatting are automatic.

SPELLING CHECKER: you'll have the first ever, on-line automatic checker with plenty of room to add words special to your business.

SPREADSHEET: this one is more powerful than VisiCalc and includes variable width columns and output formatting.

BUSINESS GRAPHICS: you'll be able to create pie charts or multiple bar charts to enhance your reports and presentations.

What's especially convenient is how Magic Office System uses icons to simplify your work.

It's all organized into drawers containing file folders, stationery and documents. You can even place folders in other folders, or "cut" parts of documents and "paste" them to others. Or move or copy documents anywhere in the system.

Lotus should be so easy!

Want a Magic Office System immediately? Check with your local dealer. If he doesn't have it, send in the coupon below.

You'll need 64k, an 80-column display, two disk drives and a whole new level of expectation about great software for Apple!

artsci™

I can't find Magic Office System at my local dealer.

☐ Please send me more information right now.

☐ I can't waste time. I want _____ copies of Magic Office System now. Enclosed is $295 per package, plus $19.18 sales tax per package for California residents.

☐ Enclosed is a check for _____.

☐ Charge to my ☐ VISA ☐ MasterCard.

Acct. No. _____

Exp. Date _____

Name _____

Business _____

Address _____

City/State/Zip _____

Telephone _____

Mail to: ARTSCI 5547 Satsuma Avenue
North Hollywood, CA 91601

Or call: 818/985-2922

A+8

Sorry, IBMers, Magic Office System is only for the Apple IIe and the IIc.

Magic Office System is a trademark of ARTSCI, INC.

CIRCLE 109 ON READER SERVICE CARD

APPLE SOFTWARE SPECIALS!

$1.00 credit for phone orders over $100.00

EDUCATIONAL (OUR SPECIALTY)

	LIST	SPECIAL
MATH		
Addition Magician	34.95	24.86
Algebra Arcade	49.95	35.96
Factor Blast	29.95	21.66
Hey Taxi!	39.95	28.56
Number Farm	29.95	21.66
Space Math	49.95	35.96
ENGLISH		
Alphabet Circus	29.95	21.66
Crossword Magic 2.0	49.95	35.96
Extra Extra!	39.95	28.56
Homeword	69.95	50.76
Key Lingo	39.95	28.56
Kidwriter	34.95	24.86
That's My Story	59.95	43.36
Word Attack!	49.95	35.96
OTHER		
Biology Facts	39.95	28.56
Bookends	124.95	90.26
Game Show	39.95	28.56
Game of the States	39.95	28.56
Go to the Head of Class	39.95	28.56
Picture Writer	39.95	28.56
Speedy Spides	34.95	24.86
Micro Habitat	39.95	28.56
SAT (Harcourt Brace)	79,95	58.16
SAT (Krell)	299.95	252.96
Trains	39.95	28.56
U.S. Government Facts	39.95	28.56
World History	39.95	28.56

Ask for FREE price list

Educators: ask for special educational catalog

HARDWARE		
Gibson Light Pen	249.95	196.96
Hayes Mach III Joystick (II+ or IIe)	54.95	39.66
Maxell Disks	51.00	29.00
Ramcard (Microsoft)	99.95	75.96
Wico Analog Joystick	49.95	35.96
Wildcard 2	139.95	110.19
MISCELLANEOUS		
Chess 7.0 (Odesta)	69.95	50.76
Eating Machine	49.95	35.96
Ess. Data Dup. (EDD)	79.95	58.16
Flight Simulator II	49.95	38.96
G.P.L.E.	49.95	35.96
Graphics Department	124.95	90.46
Graphics Magician	59.95	43.36
Inspector	59.95	43.36
Jane	295.00	215.26
Joust	34.95	28.76
Locksmith 5.0	99.95	77.96
Phi Beta Filer	49.95	35.96
Pole Position	34.95	28.76
Queen of Hearts	34.95	24.86
Questron	49.95	35.96
Sorcerer	49.95	35.96
Think Tank (II+ or IIe)	150.00	108.96
Time is Money	99.95	71.96

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CIRCLE 116 ON READER SERVICE CARD

Unlike printed directories, the Library can be updated as often as new software packages hit the market.

MARDATA

For businesses involved with international commercial shipping, Mardata provides timely, accurate information about tankers, gas carriers, and cargo ships. Mardata boasts an impressive array of clients, including Exxon, British Petroleum, Petrofina, Chase Manhattan Bank, Morgan Guaranty and Trust, the Military Sealift Command, and the U.S. Department of Agriculture.

Mardata—established as a joint venture between Marine Management Systems, Inc., Lloyd's Register of Shipping, Lloyd's of London Press, Ltd., and others—contains six databases on the maritime industry.

Ship Characteristics contains information on all known international trading ships over 1000 gross registered tons, which totals over 32,000 ships. The data breaks down into five categories and lists 66 characteristics, including flag, port of registry, speed, tonnage, cubic capacities, and number of hatches. This database helps identify ships with particular machinery or with a particular hauling capacity.

Ships On Order is similar to Ship Characteristics and contains 36 characteristics of ships under construction. Characteristics include keel date, launch date, delivery date, and cancellation date. This database helps plan the size and attributes of a fleet.

Ship Movement contains information on more than 20,000 ships sailing between 5000 ports. It holds departure and destination ports, intermediate port calls, and elapsed days of travel. This database helps analyze individual ship, trade-route, and port activity.

Charter Fixtures consists of all reported fixtures, both tanker and dry cargo, dating back to 1976. It has 16 descriptive items covering time and voyage details, including cargo type, fuel consumption, charter period, and delivery dates. This database helps analyze freight rates according to specific trade routes and commodities.

Ship Casualty holds the casualty history of all ships over 1000 gross registered tons since 1978 and all tankers over 6000 gross registered tons since 1964. It includes geographic location, cargo, persons injured, scrap value, and pollution amount. This database meets the needs of ship buyers and sellers, port authorities, insurance companies, and relevant government agencies.

Shipowner contains the name and address of a ship's registered owner, as well as links to ship managers, fleet operators, and related companies. This database helps determine which companies or individuals control a ship's operations.

All of Mardata's databases are interlocked, so that any information on a specific ship can be extracted from any database regardless of a change in name, ownership, or flag.

Mardata is not as easy to use as other telecommunications services. It requires you to enter parameter commands rather than selecting items from a menu. Maritime Data Network is revising the system to make it more convenient.

Mardata carries an annual subscription fee of between $500 and $4000, depending on the database. You also pay $45 per hour at 300 bps and $98 per hour at 1200 bps, plus telecommunications charges of $18 per hour at 300 bps and $30 per hour at 1200 bps.

AS CLOSE AS YOUR APPLE

Specialized databases provide vital information on a particular subject. Telecommunications places that information where you need it most—in front of you. With these three services—plus your Apple and a modem—you can find a job, the perfect software, and a multitude of maritime data. ✚

CONTACT

CLEO
2164 West 190th street
Torrance, CA 90504
(213) 618-0200
Cleo Access Telephone Numbers:

300 bps	1200 bps
(213) 618-8800	(213) 618-8816
(415) 482-1550	(415) 482-1557
(714) 476-8800	(714) 476-2143
(408) 294-2000	(408) 294-2426
(619) 224-8800	(619) 224-8838
(818) 991-8900	(818) 991-8916

CLEO Access Assistance:
(213) 618-1525

Searchmart Corporation
745 U.S. Highway 1
Suite 101
North Palm Beach, FL 33408
(305) 845-2996
On-Line Software Library Access Telephone Number: (305) 845-6466

Mardata
Maritime Data Network
102 Hamilton Avenue
Stamford, CT 06902
(203) 327-6404

JUST BECAUSE YOU PICK AN APPLE, DOESN'T MEAN YOU HAVE TO BUY THE WHOLE ORCHARD.

The only thing more important than having your printer compatible with your personal computer is having it compatible with you.

Which is why mixing an Okidata printer with your Apple computer is more like mixing apples with apples than you'd think.

More Printers. More Printing. For instance, Okidata gives you eight high performance printers to choose from. Apple only gives you four. We give you two-color capabilities on some models. They give you basic black and white. With Okidata you can get three print modes. With Apple, you're stuck with one. Our speeds go up to an incredible 350 cps. Theirs stop at 120.

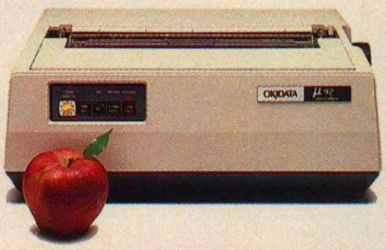
As for quality, our correspondence quality rivals the best daisywheels. And at up to 80 cps. Their letter quality printer is a daisywheel but moves along at only 40 cps. We also give you a full year's warranty on our print head. They give you 90 days. And we bring you the lowest warranty claim rate in the industry: less than ½%.

And More: Personal Touch & Plug 'n Play. With Okidata's Microline 92, 93 and 84 printers, you can get Personal Touch. A downline loading software package that lets you print personalized characters, customized symbols and typefaces, even foreign languages. From Apple, you only get the hardware.

Of course all Okidata printers are compatible with Apple computers. But now, all Okidata Microline printers interface in a matter of minutes, thanks to our new Plug 'n Play interface kit.

So, the choice is yours. Wait for a better Apple to ripen. Or pick Okidata.

For information, call 1-800-OKIDATA. In New Jersey, (609) 235-2600. Or write OKIDATA, Mt. Laurel, NJ 08054.



OKIDATA
an OKI AMERICA company

CIRCLE 240 ON READER SERVICE CARD

▸ HARDWARE/BY DAVID TOWNSLEY AND FRANCESCA VENNING-TOWNSLEY

MONITORS IN COLOR

Tired of looking at the same old green-and-black screen when you sit down with your Apple? Ready to move your Apple into the wonderful world of technicolor? Are your kids (and you) tired of playing space invaders in monochrome? Whatever your reasons, adding a color monitor to your present system can enhance its display capabilities.

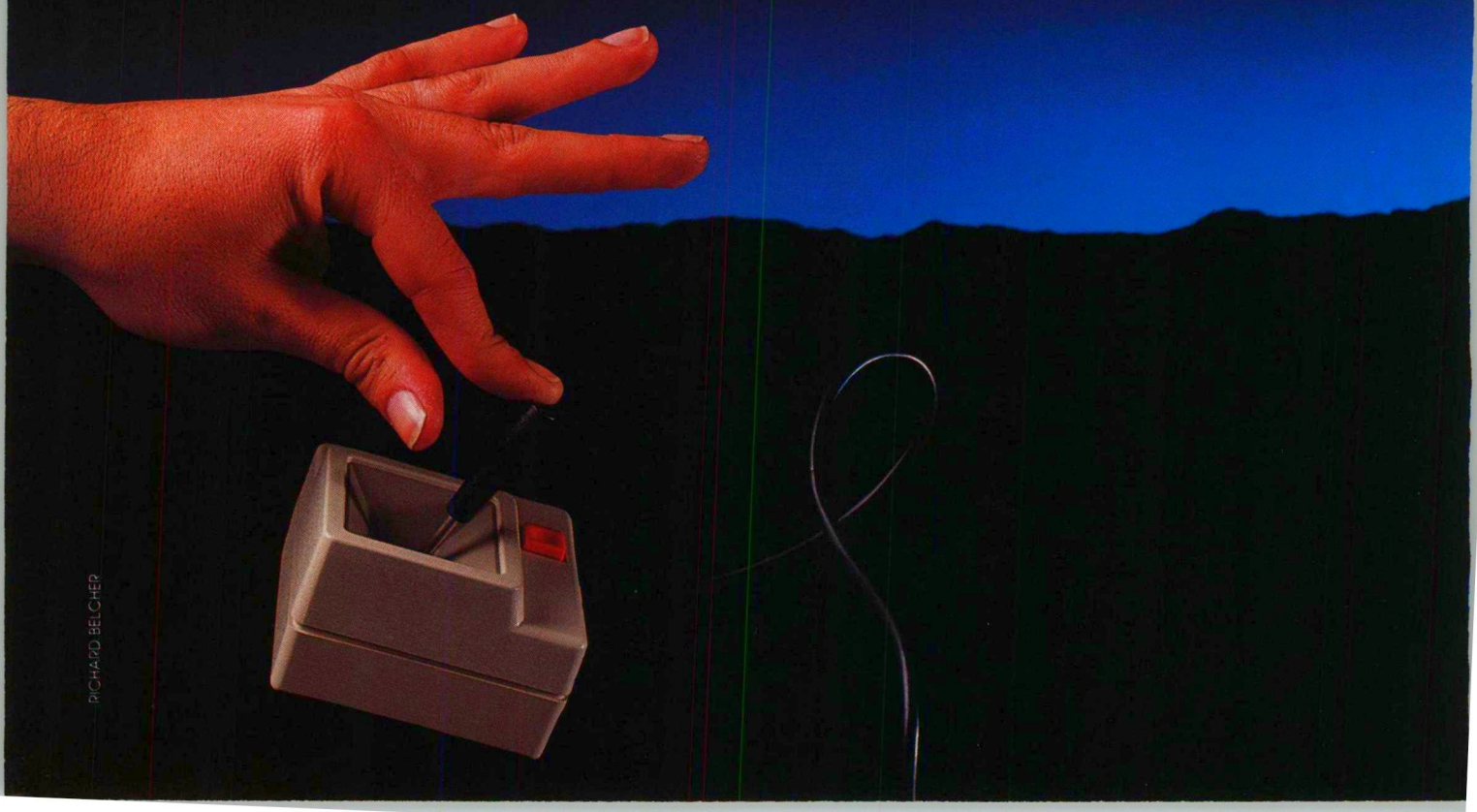
This article will include a look at the differences between the two primary types of color monitors available today: "composite" and "RGB." Since color monitors can range in price from $300 to several thousand dollars, we'll discuss some of the considerations you should think about before plunking down your money at the local computer store.

We'll also take a closer look at two composite-color monitors—the Sakata SC-100 and the Amdek Color I—and three RGB monitors—the Taxan RGB Vision 210, the Teknika MJ-22, and the AppleColor Monitor 100. Finally, you'll find some tips on shopping for a good color monitor. At the end of this article is a comparison chart on most of the color monitors that are compatible with Apple computers and cost $1000 or less.

Why a Color Monitor?

If color can enhance most of the work you do on your computer—if you do a lot of graphics on your computer or use programs in which color plays an integral part—you may have a compelling reason to buy a color monitor. If you primarily use word-processing and spreadsheet software, on the other hand, you may be better off sticking to a monochrome monitor (see next month's review of monochrome monitors).

A color monitor can help accent certain kinds of information better than a monochrome monitor can. Colors can make learning more exciting or enhance a group presentation in which the computer is the center of attention. If you are in the market for a new monitor, you should think about how and where you are going to use your com-



RICHARD BELCHER

Upper and
lower illustrations
by Peter Joselow.

Center graphic
courtesy of
Apple Computer, Inc.

puter before deciding which monitor to buy.

RGB vs. Composite

When you're watching your favorite TV show, you're looking at composite-color video. Color televisions use the same type of signal (NTSC) that composite-color monitors do. In a composite-color monitor or color television, one electrical signal controls all the available colors. In contrast, RGB monitors use three separate signals (red, green, and blue) to produce the different colors. The three separate signals represent the three primary colors of light and can be blended together to create any color. Independent control of these three primary colors allows the most precise display of colors. Thus, RGB monitors can produce sharper images than a composite monitor can.

RGB monitors invariably cost more than composite monitors, sometimes several thousand dollars more. Many RGB monitors allow you to switch back and forth between RGB and composite video. When you do switch to the RGB mode, you can no longer adjust the screen color and tint with the fine-tuning knobs, since the manufacturer presets the colors to meet exact standards. Unlike composite monitors, RGBs usually give you clear 80-column displays, although they are rarely as sharp as those of monochrome monitors. If you own an Apple II-series computer, you will need an RGB video-display card (at an extra $100–$200, or more) to be able to utilize an RGB monitor.

A wide variety of RGB display cards is on the market. One of the foremost manufacturers of RGB cards is Video-7 of Saratoga, California, which offers several RGB cards. One is for the Apple II and II Plus and plugs into slot 7. Another is designed for the IIe's special auxiliary slot and combines 64K of additional RAM with the functions of an RGB card and an 80-column card. The third Video-7 product is an RGB interface for the IIc. Video-7 also offers a special adapter called the Mappler that lets you use IBM PC-compatible RGB monitors with the Apple II series.

Apple III computers, on the other hand, can be directly connected to RGB monitors without the card, since the Apple III and III Plus already contain the necessary RGB interface circuitry.

How to Choose

Consider your viewing requirements and your wallet in choosing between a composite or RGB monitor. Ask yourself the following questions:

- Is the clarity of the color display critical to teaching, selling, or getting information across to others?
- Do your color graphics need to be as sharp as possible?
- Do you need to see 80-column text and color graphics on the same screen?
- Will you need to display color pictures of complex drawings, schematics, or 3-D diagrams?
- Will close-up photographs be taken of the color display?
- Are you willing to pay $500–$600 or more for a color monitor?

In a composite-color monitor or color television, one electrical signal controls all the available colors. In contrast, RGB monitors use three separate signals to produce the different colors.

If you answered two or more of the above questions affirmatively, you are probably in the market for an RGB, rather than a composite, monitor. If you don't fit into this group, your existing monochrome monitor will probably serve your everyday needs for 80-column display, and you can purchase an additional composite color monitor for graphics or entertainment purposes.

The two composite and three RGB monitors in our overview are only a sample of the color monitors available for use with Apple computers. For our evaluation, we connected these monitors to an Apple IIe computer and evaluated them with both 80-column and graphics applications.

Sakata SC-100

The Sakata SC-100 is a classic example of what a composite-video monitor can do. Although it can display nice color graphics and 40-column text, it cannot show 80-column text clearly. Like other composite monitors, the Sakata is as easy to connect as your monochrome monitor, since you don't need any additional circuit cards. The headphone jack that comes with the product is a plus, since users of programs with sound can listen without disturbing those around them. Unfortunately, this feature does not work on the Apple IIe without an adapter that connects to the Apple IIe motherboard—nor does the monitor's speaker. The large green power-on button and light are a nice addition to remind you that the monitor is on.

Amdek Color I

The Amdek "look" is more like that of a conventional TV, and its size is fairly hefty. Although it lacks a power-on light, the Amdek monitor does include a handle on the top of the cabinet. Installation is as simple as plugging in the video jack. Behind a small door in the front of the unit are the conveniently located fine-tuning controls. Although sound and volume control are available, the Apple IIe requires the additional adapter to utilize this feature. For a composite-color monitor, the Amdek Color I produces sharp and vivid colors.

Taxan RGB Vision 210

The Taxan RGB Vision 210 is an RGB as well as a composite-color monitor. The monitor is compact and quite boxlike for a color monitor, but it also includes a display area that is smaller than most. In order to use this product as an RGB monitor with the Apple II series, you need to purchase Taxan's additional RGB video display. A bit of soldering and replacement of an integrated-circuit chip are also part of this card's installation, which can be a tricky procedure. One nice thing about the additional circuit card is the inclusion of a thumb wheel that allows you to select a default color for text that appears on the monitor. Unlike other circuit cards, this card allows you to change the color of the text on the screen without having to remove the card from your Apple. An included antiglare screen improves the contrast on the monitor's screen. Although this monitor is capable of displaying 80-column text, the display is harder to read than that of other RGB monitors we examined.

Teknika MJ-22

The Teknika MJ-22 is another RGB monitor that allows you to switch to composite video if you desire. With a larger-than-average screen and display area, the Teknika combines a sleek look with some extra features.

Most of the tuning controls are located right in front, behind a hidden door. A video input-level control in the rear of the monitor gives you extra brightness control in the Composite Color mode. Jacks in the rear of the monitor let you use headphones or even a second (composite-color) monitor.

▶ COLOR MONITORS/BY JONATHAN NEHER

MANUFACTURER	MODEL	LIST PRICE	COLOR SIGNAL	DISPLAY AREA (MM)	SCREEN PIXELS	CHARACTER DISPLAY	BANDWIDTH	CARD #
Amdek Corp.	Color I	$399	C-V	245 mm × 185mm	260 × 300	40 × 24	4 MHz	680
	Color 300	$349	C-V	245mm × 185mm	260 × 300	40 × 25	4 MHz	681
	Color 400	$399	RGB	266mm × 191mm	380 × 240	40 × 25	4 MHz	682
	Color 500	$525	Both	266mm × 196mm	560 × 240	80 ×25	4 MHz	683
	Color 600	$649	RGB	240mm × 180mm	640 × 240	80 × 25	12 MHz	684
	Color 700	$749	RGB	233mm × 180mm	720 × 240	96 × 25	16 MHz	685
Apple Computer	Apple Color 100	<$600	RGB	216mm × 160mm	600 × 416	80 × 24	25 MHz	686
Electrohome	ECM1302-2	$419	Both	245mm × 185mm	580 × 235	80 × 25	10 MHz	687
NEC	JC1215A	$399	C-V	135mm × 215mm	300 × 250	40 × 25	4 MHz	688
	JC1216DFA	$599	RGB	135mm × 215mm	640 × 240	80 × 25	10 MHz	689
	JC1410P2A	$998	RGB	150mm × 240mm	800 × 400	80 × 25	23 MHz	690
Panasonic	DT-S101	$330	C-V	228mm × 180mm	300 × 300	40 × 25	5 MHz	691
	DT-1300D	$500	Both	245mm × 185mm	333 × 220	80 × 25	10 MHz	692
	DT-1000G	$450	RGB	228mm × 180mm	333 × 220	80 × 25	10 MHz	693
Sakata	SC-100	$329	C-V	228mm × 180mm	280 × 300	40 × 25	4 MHz	694
	SC-200	$649	RGB	240mm × 108mm	640 × 240	80 × 25	4 MHz	695
Sanyo	AVM196	$599	Both	386mm × 289mm	400 × 240	40 × 25	5 MHz	696
	AVM255	$799	Both	386mm × 289mm	400 × 240	80 × 25	5 MHz	697
	DMC6500	$346	Both	250mm × 185mm	350 × 350	80 × 25	5 MHz	698
	DMC7500	$508	RGB	250mm × 185mm	480 × 240	80 × 25	7 MHz	699
Sony	PVM12700	$915	Both	245mm × 185mm	625 lines	80 × 25	15 MHz	700
	KX8200	$795	RGB	200mm × 150mm	640 × 240	80 × 25	15 MHz	701
	KX1901A	$850	Both	350mm × 200mm	450 lines	80 × 25	10 MHz	702
Taxan	RGB Vision 210	$399	Both	228mm × 180mm	380 × 262	80 × 25	15 MHz	703
Teknika	MJ-22	$539	Both	270mm × 160mm	506 × 240	80 × 25	18 MHz	704
USI	1400/C	$399	C-V	245mm × 185mm	260 × 300	40 × 25	4 MHz	705
Zenith	ZVM-131	$379	Both	250mm × 185mm	390 × 240	40 × 25	6 MHz	706
	ZVM-135	$599	Both	250mm × 185mm	640 × 240	80 × 25	20 MHz	707

**For more information on any of these products, circle the corresponding card number on the Reader Service Card in this issue.*

The monitor's relatively light weight (for its size), combined with the convenience of handles built into the top of the cabinet, make for easy lifting. As with other RGB monitors, you need an additional circuit card for Apple II-series computers.

AppleColor Monitor 100

Apple's newest addition to its line of peripherals is an RGB monitor that is a real heavyweight. The AppleColor 100 includes a motor that allows you to adjust the tilt of the screen by pushing a button. Thus, this monitor is about 50% heavier than most color monitors. Because this monitor was designed for Apple computers, your computer components will look like they belong together. Even though this monitor is from Apple, the Apple II computers still require an RGB interface card.

The fine-tuning controls are conveniently located behind a concealed door on the front of the monitor. Since this is an RGB-only monitor, you will not find any color or tint controls. When displaying 80 columns, the AppleColor 100 screen was easier to read than the other RGB monitors we saw. Unfortunately, the colors were not as vivid as those of some of the other color monitors. As usual, Apple provides thorough documentation and instructions on installation and use for both the new monitor and the required RGB interface.

Buying Strategies

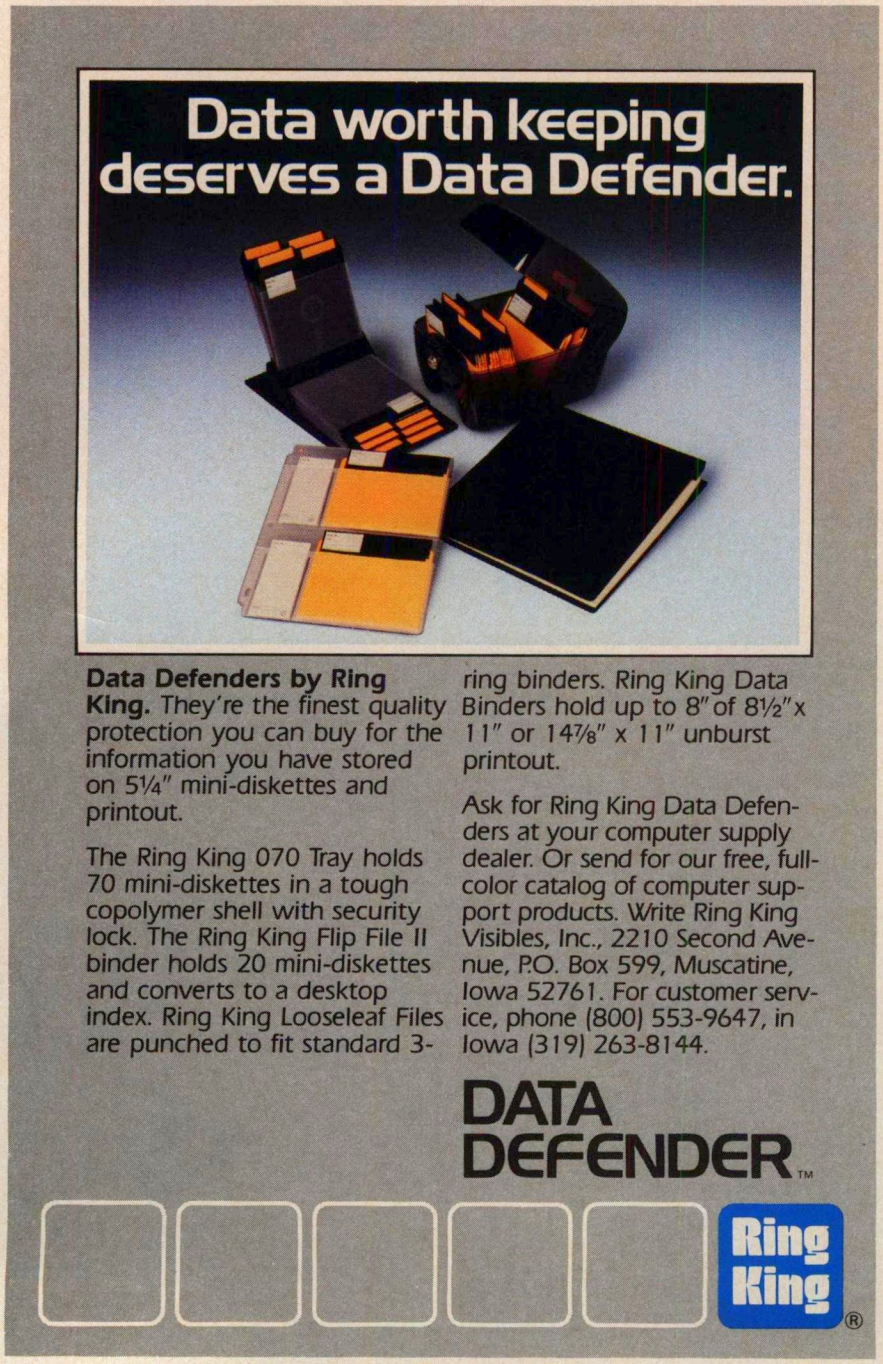
If you're convinced that a color monitor is right for you, how can you tell a superior monitor from a merely adequate one? First, when you go shopping for a new monitor at your local computer emporium, take along a few diskettes that typify the type of work you do or plan to do with a color monitor. In so doing, you will be able to see whether or not the monitor you have in mind will enhance the type of work you normally do on your Apple or detract from it. A good approach is to observe the monitor working with the same type of computer (including additional circuit cards) that you have at home. If you are shopping for an RGB monitor, keep in mind that most software is not written to take full advantage of the capabilities of a specific RGB monitor.

Don't be afraid to visit several computer stores in order to try out as many different color monitors as possible. Since you will be spending a lot of time staring at the screen later on, it pays to spend some time selecting a monitor that you feel comfortable with.

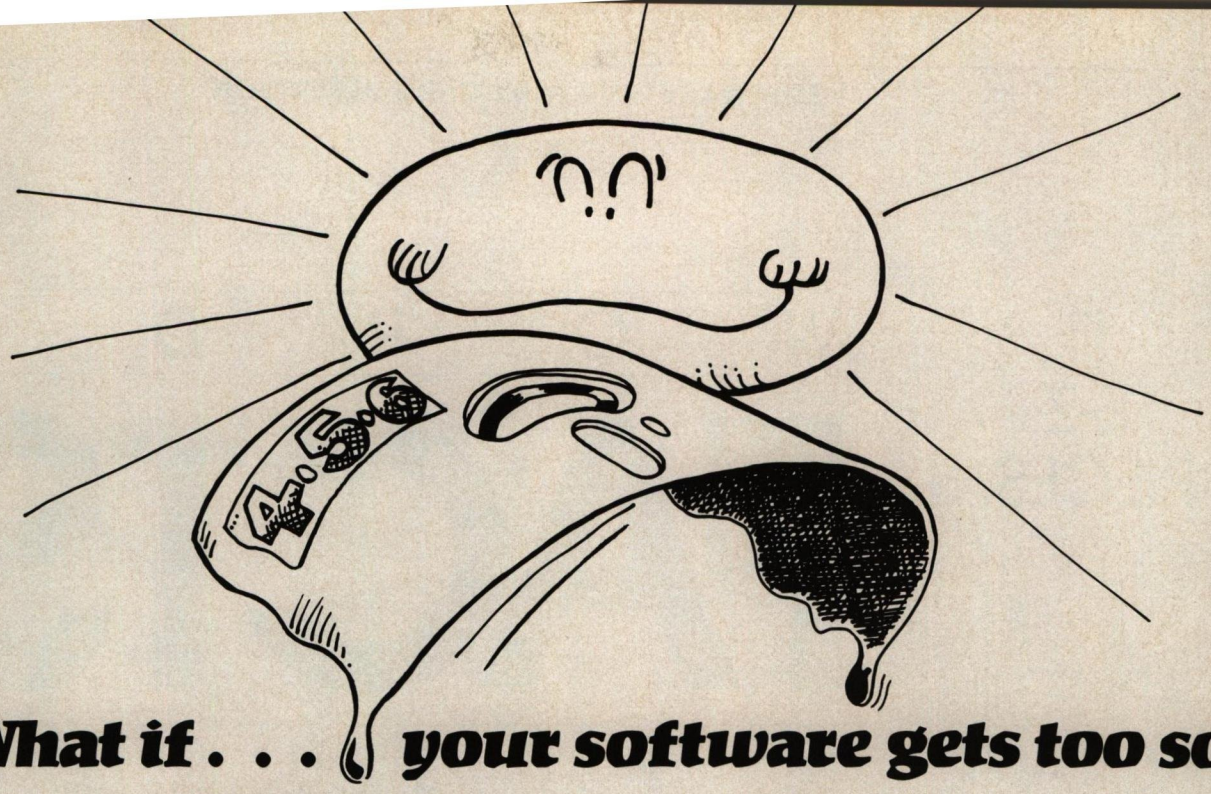
If you plan to use your color monitor for 80-column display, test the monitor's resolution by filling the screen with lowercase *m*'s and judging how sharp they look. To further evaluate an RGB monitor, make sure that the text is white (not fringed around the edges by other colors) throughout the screen, including the four corners.

Make sure that any information on the screen is not chopped off or missing and that screen edges are straight. Finally, run a fast-moving game or animated sequence in order to evaluate the phosphor tracing (how long the screen glows after a character has disappeared from the screen) and see if it bothers you.

Most important, remember that buying a monitor is based on your own subjective judgment concerning color, resolution, brightness, contrast, and your viewing comfort. Don't be unduly swayed by the salesperson or the manufacturer's advertising. If the monitor is comfortable for you to use, meets your computing needs, and is within your price range, then it's the color monitor for you. ✚



CIRCLE 215 ON READER SERVICE CARD



What if . . . your software gets too soft?

You need software insurance.

Diskettes are fragile, and when a protected program is damaged, the results are expensive and inconvenient. If you have a backup diskette, though, you can have your Apple, IBM or compatible computer back on line within seconds . . . affordably. That's software insurance.

Copy II Plus (Apple][,][Plus, //e)

This is the most widely used backup program for the Apple. Rated as "one of the best software buys of the year" by **InCider** magazine, its simple menu puts nearly every disk command at your fingertips. The manual, with more than 70 pages, describes protection schemes, and our **Backup Book™** lists simple instructions for backing up over 300 popular programs. A new version is now available that is easier to use and more powerful than before. Best of all, Copy II Plus is still only **$39.95.**

NEW!

WildCard 2 (Apple][,][Plus, //e)

Designed by us and produced by Eastside Software, WildCard 2 is the easiest-to-use, most reliable card available. Making backups of your total load software can be as easy as pressing the button, inserting a blank disk and hitting the return key twice. WildCard 2 copies 48K, 64K and 128K software, and, unlike other cards, is always ready to go. No preloading software into the card or special, preformatted diskettes are required. Your backups can be run with or without the card in place and can be transferred to hard disks. **$139.95** complete.

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These products are supplied for no other purpose and you are not permitted to utilize them for any use, other than that specified.

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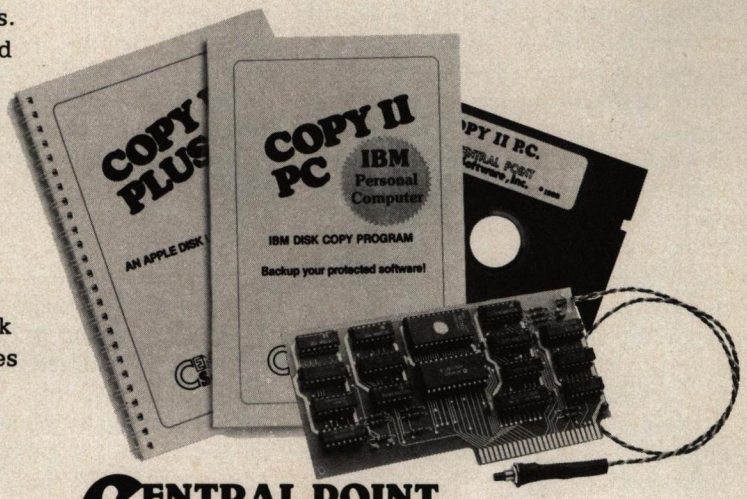
This is **THE** disk backup program for the IBM PC and PC/XT that backs up almost anything. Others may make similar claims, but in reality, nothing out performs Copy II PC . . . at any price. Copy II PC even includes a disk speed check and is another "best buy" at only **$39.95.**

We are the backup professionals. Instead of diluting our efforts in creating a wide variety of programs, we specialize in offering the very best in backup products. So, protect your software investment, **before** things get too hot.



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The Backup Professionals

To order, call 503/244-5782, 8:00-5:30 Mon.-Fri., or send your order to: Central Point Software, 9700 SW Capitol Hwy, Suite 100, Portland, OR 97219. **Prepayment is required. Please include $3 for shipping and handling ($8** outside U.S. or Canada).

CIRCLE 184 ON READER SERVICE CARD

▶ SOFTWARE REVIEW/BY CHRIS ALBERTSON

III E-Z PIECES, A SUPERB APPLE III PACKAGE

WORDS FACTS & FIGURES

In 1979, when I acquired my second computer, an Apple II Plus, I more or less relegated my TRS-80 to serve as a doorstop, but as the months went by, I decided that having two machines side by side might, after all, not be such a redundancy. So the "trash" came off the floor, so to speak; received an upgrade here and there; and took its place next to the Apple. What at first appeared excessive turned out to be quite practical when I ran a word processor on one computer and a database with relevant information on the other.

Today's integrated software offers a far more practical approach to juggling various functions. Obviously, as the enormous success of such programs as Lotus 1-2-3 demonstrates, the ability to work business programs side by side fulfills a need. And now Apple III owners, who may have read about the virtues of Lotus 1-2-3 with envy, will be happy to learn that you don't have to have an IBM Personal Computer or a PC-compatible to experience the joys of switching back and forth among word processor, spreadsheet, and data base. Haba Systems' III E-Z Pieces (3EZP) is designed especially for the Apple III, and it does the job splendidly. Not only does the program allow movement from one function to another with a couple of keystrokes, but it also has a cut-and-paste feature that makes it a snap to merge database or spreadsheet information into, say, the body of a letter, or to perform other feats of true integration, such as incorporating files other programs have created.

Some integrated software is marred by sacrifices that programmers had to make in order to cram three or four programs into the space that a single program would normally occupy. In 3EZP's case, however, Rupert Lissner has done a fine job of making the program not only live up to its name but also perform its three tasks impressively. The three programs are clearly designed for serious applications, but I should point out that this is not Word Juggler, AppleFile III, and VisiCalc all rolled into one. Some Apple III users will probably still want to have these or similar heavyweight individual programs around for more demanding tasks.

The 3EZP package consists of three copyable disks (Boot, Program, and Sample Files) and a 256-page spiral-bound manual. After you boot the program, which requires a disk swap, the Program disk must remain in the internal drive, while a data disk can be in any other drive. You can run 3EZP with only the internal drive, but you'll have to swap disks each time you save data or retrieve an additional file.

Although it essentially involves three programs, 3EZP actually contains *four*, one being a desktop manager designed to handle manipulation of the other three as well as normal I/O traffic. Taking full advantage of the Apple III's aptly named Sophisticated Operating System, the design of this fourth program is crucial to the success of the package as a whole. You might say that it is as vital to the software as the CPU is to the computer, and because it is so well thought out, maneuvering data and programs to and from the screen is a breeze. You perform all functions by using a series of menus that appear on the screen as file cards, stacked one on top of the other in the popular window style of the Lisa and the Mac, though not with quite the same finesse. Thus, a request to add files to the desktop, from the main menu, places the Add Files card on top, and the screen becomes a desktop capable of holding as many as 12 files at once. These files can be from any of the three programs, and none is more than three keystrokes away from the top of the stack. Sending information to a printer in a specified format is an equally simple task.

Words

I would not want to write a novel with it, but the 3EZP word processor has more features than you would expect to find in a program that shared space with two others—it even has a couple of abilities that you won't find in some high-priced dedicated word processors. It lacks automatic hyphenation and footnoting, but I have to say the same thing about my favorite Apple III word processor, Word Juggler.

ADRIAN DAY

Apple® Programming Utilities

□ GPLE™ (Supports DOS 3.3 *and* ProDOS™)

GLOBAL PROGRAM LINE EDITOR by NEIL KONZEN
$49.95: Includes Peeks/Pokes Chart & Tip Book #7

THE NUMBER 1 APPLE PROGRAM LINE EDITOR GPLE lets you edit 40- or 80-column Applesoft program lines *FAST* without awkward cursor-tracing or "Escape editing". Compatible with Double-Take's 2 way scrolling.

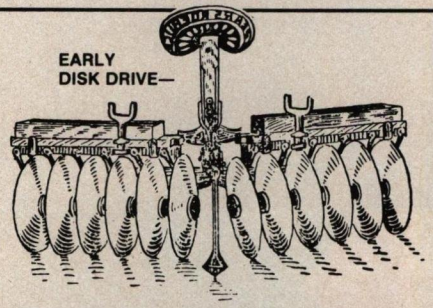
INSERT & DELETE: GPLE works like an in-memory word processor for Applesoft program lines. Simply jump the cursor to the change-point and insert or delete text. No need to trace to the end of a line before hitting Return.

GLOBAL SEARCH & REPLACE: Find any word or variable in your programs, *FAST*. For example, find all lines containing a GOSUB, or all occurrences of variable XY. REPLACE ANY VARIABLE or word with any other. For example, change all X's to ABC's, or all "Horses" to "Cows".

DEFINABLE ESC FUNCTIONS: Define ESC plus any key to perform any task. For example, **ESC-1** can catalog drive 1, or **ESC-N** could type an entire phrase or subroutine. *Anything* you want, *whenever* you want.

GPLE DOS MOVER: Move DOS 3.3 & GPLE above main memory for an EXTRA **10K** of programming space.

PLUS APPLE TIP BOOK #7: Learn more about your Apple! Includes all-new useful GPLE tips and tricks.



□ BEAGLE BASIC™ (REQ. 64K)

APPLESOFT ENHANCER by MARK SIMONSEN
$34.95: Includes Peeks/Pokes Chart & Tip Book #6

RENAME ANY APPLESOFT COMMAND or Error Message to anything you want. For program clarification, encryption/protection or even foreign translation. Example:

10 POUR X=1 TO 3: ECRIVEZ "BONJOUR": ENSUITE

RAM Applesoft is *better* Applesoft! Beagle Basic replaces those obsolete cassette commands (SHLOAD, etc.), with powerful new commands that you can USE—

ELSE follows Applesoft If-Then statements, like this:

IF X=2 THEN PRINT "YES": ELSE PRINT "NO"

HSCRN reads the color of a hi-res dot for collision testing, **SWAP** exchanges variable values, **TONE** writes music without messy Pokes or Calls, **SCRL** scrolls text in *either* direction, **TXT2** lets Text Page 2 act exactly like Page 1...

GOTO AND GOSUB may precede variables, as in "GOSUB FIX" or "GOTO 4+X". Escape-mode indicated by a special ESCAPE CURSOR. Replace those awkward Graphics screen-switch pokes with one-word commands. Change your ctrl-G Beep to any tone you want. **INVERSE REM STATEMENTS** too! GPLE/Double-Take compatible.

□ DOS BOSS™

DOS 3.3 EDITOR by BERT KERSEY & JACK CASSIDY
$24.00: Includes Peeks/Pokes Chart & Tip Book #2

RENAME DOS COMMANDS and Error Messages—DOS 3.3's "Catalog" can be "Cat"; DOS's cryptic "Syntax Error" can be "Oops" or almost *anything* you want it to be.

PROTECT YOUR PROGRAMS. Unauthorized Save-attempts can produce "Not Copyable" message, or *any* message. **List-Prevention** and other useful Apple tips and tricks. Plus one-key program-execution from catalog.

CUSTOMIZE DOS. Change Disk Volume headings to your message or title. Omit or alter catalog file codes. Fascinating documentation, tips & educational experiments.

ANYONE USING YOUR DISKS (booted or not) will be forced to use DOS formatted the way YOU designed it.

□ DOUBLE-TAKE™ (DOS 3.3 *and* ProDOS™)

2-WAY SCROLL/MULTI-UTILITY by MARK SIMONSEN
$34.95: Includes Peeks/Pokes Chart & Tips Chart #1

2-WAY SCROLLING: Listings & Disk Catalogs scroll Up *and* Down, making file names and program lines faster to find and easier to access. Change Catalog or List scroll-direction with Apple's Arrow keys. Machine Language and Hex/Ascii dumps scroll two-ways too. All features are GPLE compatible and support 80-column display.

BETTER LIST FORMAT: Each Applesoft program statement lists on a new line for *FAST* program tracing & de-bugging (see sample below). Printer-compatible in any column-width—Great for archive printouts.

A$="DOGFOOD" ← **VARIABLE-DISPLAY:** prints
X=3.14159 all of a program's strings and vari-
Y=255 ables with their current values.

A$: 100 200 250 ← **CROSS-REFERENCE:** Sorts
X: 10 20 3000 & displays line numbers where
Y: 10 40 55 60 each variable & string appears.

AUTO-LINE-NUMBER, instant Hex/Dec Converter, better Renumber/Append, Program Stats, Eliminate/Redefine Cursor, Free Space-On-Disk... All GPLE/Pronto compatible.

2-WAY VIDEO SCROLLING

```
]LIST
10 HGR2
   : FOR Y=0 TO 191
   : POKE 228, C
   : C=C+1/9-256*(C=255)
20 REM "Double-Take
   optionally lists each
   Applesoft program
   statement on a new
   line, making pro-
   gram code much
   easier to read."
30 HPLOT 0,Y TO 279,Y
   : NEXT Y
   : POKE 2053,58
   : GOTO 10
```

High-Speed DOS

□ PRONTO-DOS™

HIGH-SPEED DOS/DOS-MOVER by TOM WEISHAAR
$29.50: Includes Peeks & Pokes Chart

TRIPLES THE SPEED of disk access and frees 10,000 bytes of extra programmable memory by moving DOS 3.3.

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec.	3 sec.
LOAD 60-SECTOR PROGRAM	16 sec.	4 sec.
SAVE 60-SECTOR PROGRAM	24 sec.	9 sec.

(Text-files no change) **Bload language cards** at *triple speed.* Create bootable high-speed disks with the normal INIT command. Compatible with *all* commands, GPLE, Double-Take, DOS Boss, DiskQuik & most unprotected programs.

MOVE DOS 3.3 above main memory to free *10,000 bytes* of memory for your programs (64K required to move DOS).

15 EXTRA SECTORS per disk. Catalog Free-Space is displayed on the screen every time you Catalog a disk.

NEW TYPE-COMMAND ("TYPE filename") prints the contents of any Text File on-screen or to your printer.

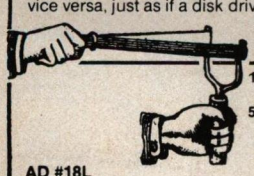
□ DISKQUIK™ (Requires IIe with 128K)

DISK EMULATOR by HARRY BRUCE & GENE HITE
$29.50: Includes Peeks & Pokes Chart
Requires EXTENDED 80-column card (128K)

ACTS LIKE A DISK DRIVE in Slot 3, but super-fast and silent! Enjoy many of the benefits of another drive at 1/10th the cost. Catalog with "CATALOG, S3" command. Access all kind of files in RAM with normal DOS commands.

SILENT AND FAST: Since no moving parts are involved, DiskQuik operates at super-high speeds. See to believe! Your Apple IIe's Extended 80-column Card (required) holds about half the amount of data as a 5¼" floppy!

MANY USES: For example, load often-used files like FID into RAM when you boot up, so they are always available when you need them. Copy files from RAM onto disk and vice versa, just as if a disk drive were connected to slot #3.



COMPATIBLE with all normal DOS procedures.

```
1234 TEXT: HOME: NORMAL:
     PRINT CHR$(21)
5678 R=INT(RND(1)*10): N(R)=
     N(R)+1: VTAB R+9: HTAB
     40: PRINT CHR$ (124); SPC
     (N(R)); CHR$(R+65): :
     IF PEEK(36) THEN 5678
```

AD #18L

Multi-Utilities

□ UTILITY CITY™

21 PROGRAMMING UTILITIES by BERT KERSEY
$29.50: Includes Peeks/Pokes Chart & Tip Book #3

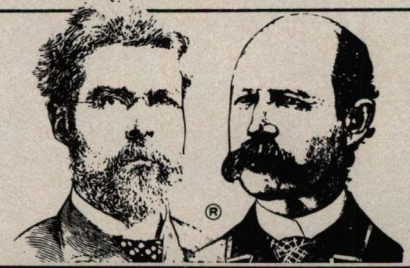
LIST FORMATTER prints each Applesoft program statement on a new line. For-Next Loops are indented with printer Page Breaks. A great Applesoft program de-bugger.

MULTI-COLUMN CATALOGS to your printer, with or without sector and file codes. Organize your disk library.

INVISIBLE AND TRICK catalog File Names. Put invisible functioning commands in Applesoft programs too.

21 UTILITIES TOTAL, including auto-post Run-number & Date in programs, alphabetize/store info on disk, convert dec to hex or Int to FP, protect and append programs, dump 40-column text to printer. And More.

LEARN PROGRAMMING TRICKS: LIST-able programs and informative documentation. Includes Tip Book #3— Hours of good reading and Applesoft experiments.



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Micro Software Inc.

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SAN DIEGO, CA 92110 / 619-296-6400

Attention Appliers: Most Apple dealers and software stores have Beagle Bros products on their shelves. If you can't find the disk you want, bug the manager—he can have *any* of our products in his store for you within a couple of days.

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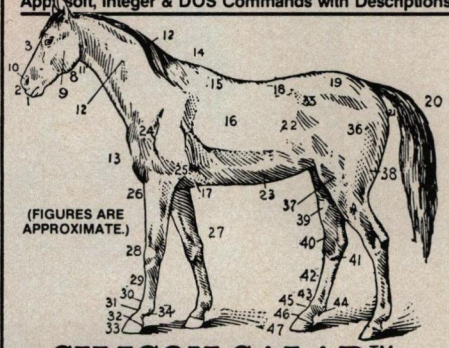

□ SILICON SALAD™

WITH TIP DISK #2 by BERT KERSEY & MARK SIMONSEN
$24.95: With Peeks/Pokes Chart & Apple Command Chart

MANY MINI-UTILITIES: Program Splitter makes room for hi-res pix in large Applesoft programs, **Disk Scanner** finds bad disk sectors, **Key-Clicker** adds subtle sound as you type, **DOS-Killer** adds two tracks of space to your disks, **2-Track Cat** allows up to 210 DOS 3.3 file names per disk, **Text Imprinter** converts text-screen text into hi-res text, **Onerr Tell Me** prints the appropriate error message but continues program execution, **Text Screen Formatter** formats and converts text layouts into Print statements... plus much more Apple wizardry from the boys at Beagle Bros.

MORE TIPS ON DISK: Over 100 programs from Beagle Bros Tip Books 5, 6 and 7; *and* from Tip Chart #1.

TWO-LINERS TOO: From our customers around the world—and elsewhere. New tricks for your old Apple!

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Apple® Graphics Utilities

NEW!

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DOUBLE HI-RES GRAPHICS by MARK SIMONSEN
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Requires Apple IIc (or IIe with EXTENDED 80-col. card).

560-WIDE WITH 16 COLORS! Beagle Graphics gives your 128K-Apple (required) a full range of colors plus *double* high resolution—560 x 192 pixels. All Applesoft hi-res functions, including shape tables, are supported.
NEW COMMANDS let you draw fast circles, ellipses and rectangles from the keyboard or from your programs.
FAST COLOR FILL fills any outline with one of 16 solid colors or 256 color mixes (usable in your programs).
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DOUBLE-PLOT PROGRAM lets you draw and manipulate pictures in double hi-res. Add type to pix too. Move sections of images to either page. Save pictures to disk.
HI-RES TRICKS: Amazing stuff— any portion of a picture may be rotated, flopped, moved, inverted, superimposed, scrunched or even SAVED to disk. Saving image-portions conserves disk space.

☐ TRIPLE-DUMP™

SINGLE/DOUBLE HI-RES "PRINT-ANYTHING" UTILITY
$39.95: Includes Peeks & Pokes Chart

PRINT ANY SCREEN IMAGE on your dot-matrix (graphics-capable) printer— Hi-Res, Lo-Res, **Double Hi-Res,** Medium-Res, as well as 40 **and 80-Column Text**. All print functions may be used in your Applesoft programs and disks. Don't settle for a "locked up" printer-dump program.
SPECIAL EFFECTS: Crop, rotate, enlarge, distort, invert... Preview pictures on the screen before you print.
BANNER MAKER: Make impressive 8"-high signs and banners for your family, home or office. Type any message—no length limit—and let your printer do the work!

☐ ALPHA PLOT™

STANDARD HI-RES GRAPHICS UTILITY
by BERT KERSEY & JACK CASSIDY
$39.50: Includes Peeks/Pokes Chart & Tip Book #4
(Alpha Plot offers 6-color 280-pixel resolution and requires only 48K; see Beagle Graphics for 128K double hi-res.)

DRAW IN HI-RES on both pages using easy keyboard commands. Pre-view lines before plotting. Use solid or mixed colors and Reverse (background opposite). One-keystroke circles, boxes and ellipses, filled or not. All pictures are Save-able to disk for access by your Applesoft programs.
COMPRESS HI-RES DATA to 1/3 disk-space, allowing 3-times the number of hi-res pictures per disk (avg. figures).
MANIPULATE IMAGES: Superimpose pictures or *relocate* sections of images anywhere on either hi-res page.
HI-RES TYPE: Add variable-size color & b/w text to your pictures. Type *anywhere* with no htab/vtab limits. Type sideways too, for Charts & Graphs. Includes Tip Book #4.

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FLEXIBLE-TEXT UTILITY by MARK SIMONSEN
$29.50: Includes Peeks & Pokes Chart

PUT VARIABLE-WIDTH TEXT on both hi-res screens with normal Applesoft commands (including HTAB 1-70). Normal, expanded & compressed text with no extra hardware. (70-column text requires b/w monitor, not a tv).
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DOS TOOL KIT® font compatibility. Access up to 9 fonts in memory. Text editor lets you redesign text characters.

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FAST APPLE DISPLAY UTILITY by TOM WEISHAAR
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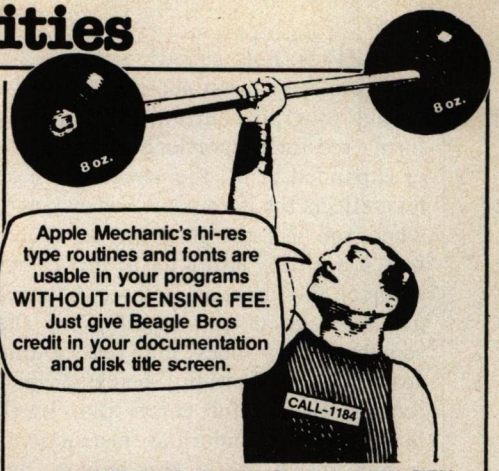
UNATTENDED SHOWS optional— each picture arranged and pre-programmed to display 1 to 99 seconds. Text Screen Editor creates black & white text "slides" ; lets you key-in type "live" during shows. Mail copies of presentations-on-disk to friends & associates (or home to Mom!).



☐ APPLE MECHANIC™

HI-RES SHAPE EDITOR & FONTS by BERT KERSEY
$29.50: Includes Peeks/Pokes Chart & Tip Book #5

SHAPE EDITOR: Keyboard-draw hi-res shapes for animation in your Applesoft programs. Easy "List & Learn" Applesoft demos teach how to do hi-res animation as well as professional-looking hi-res Charts and Graphs.
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MORE: Useful music, text and hi-res tricks for your Applesoft programs. Clear educational documentation and step-by-step instructions for writing graphics programs.

APPLE MECHANIC HI-RES

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$20.00: Includes Peeks & Pokes Chart

26 NEW FONTS for use with Apple Mechanic programs. Many different sizes and typestyles, both ordinary and *Artistic*. Every character—from A to Z to "★" to "□"—of every typeface—from "Ace" to "Zooloo"—is re-definable to suit your needs. All type is *proportionally spaced* for a more professional appearance. People *do* notice the difference!

Disk Librarian

NEW!

☐ FATCAT™

PERSONAL DISK LIBRARY by ALAN BIRD
$34.95: Includes Peeks & Pokes Chart

MULTIPLE-DISK CATALOG: FATCAT reads all of your DOS 3.3 and ProDOS™ disks into one or more "Master Catalogs" that can be searched, sorted and printed. Update at any time by simply reading in new or altered disks.
ALPHABETIZE FILE NAMES: Sort your DOS 3.3 and ProDOS disk catalogs alphabetically, by file name, type, etc., to make files easier to find. Re-locate individual file names too. Find files *fast* every time you CATALOG. This feature alone is worth the price of FATCAT!
COMPARE FILES: Compare any program in memory with any other on disk. Each differing program line is called out so you can tell which is the latest version.

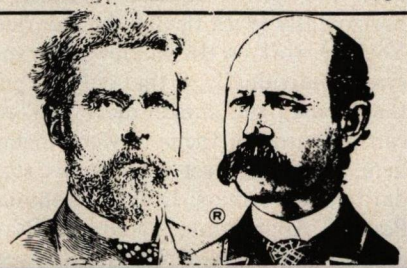
```
10 REM BEAGLE CARD FILE
20 HGR: HGR2: POKE 232, 120: POKE 233, 64: POKE
   16504, 7: SCALE=80: P=16: X=99: FOR R=0 TO 31:
   P=P*-1: POKE 230, 48+P
30 FOR Y=0 TO 1: ROT=ABS(64*Y-R): HCOLOR=3:
   FOR A=1 TO 25: DRAW 1 AT X+2*A, X: NEXT
40 HCOLOR=0: DRAW 1 AT X, X: ROT=32: DRAW 1:
   DRAW 1 AT X, X: NEXT Y, R
50 FOR A=0 TO 20: FOR B=0 TO 1: POKE 49237-B,0:
   X=PEEK(49200): FOR C=1 TO 6*A
60 NEXT C, B, A: GOTO 50
```

Beagle Bag!

☐ BEAGLE BAG™

12 APPLE GAMES ON DISK by BERT KERSEY
$29.50: Includes Peeks & Pokes Chart
Apple software customers recently voted BEAGLE BAG to Softalk's "Most Popular Software" list for 1983.

COMPARE BEAGLE BAG with any one-game locked-up disk on the market today. All 12 games are a blast, the price is right, the instructions are crystal clear, *and* the disk is COPYABLE. You can even *change* the programs or list them to learn programming tricks by seeing how they work.
TWELVE GAMES that *last*— TextTrain, Wowzo, Magic Pack, Buzzword, Slippery Digits, and many many more...
EXCELLENT REVIEWS—Read Jan-83 *Softalk*, pg.148.



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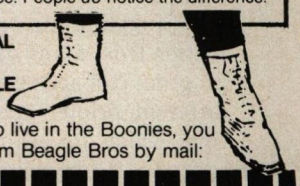

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☐ Beagle Bag	29.50	☐ GPLE	49.95
☐ Beagle Basic	34.95	☐ ProntoDOS	29.50
☐ Beagle Graphics	49.95	☐ Silicon Salad	24.95
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3EZP is not, strictly speaking, a what-you-see-is-what-you-get word-processing program, but unless the text is formatted for proportional, condensed, or expanded print, the screen more or less reflects the hard copy. For instance, when you ask the program to center text, it dutifully jumps to the proper position on the screen. You'll see the margins and insets you specify, but the screen display does not reflect line spacing, justification, headers, and footers. Except for carets that mark boldface and underline instructions, printer-option marks are hidden, but pressing the open-apple key and Z (for *zoom*) produces a fully marked text on the screen.

The maximum size of a 3EZP word-processor file depends on the computer's memory capacity. With 128K RAM, the machine can hold 47,000 characters (approximately 18 single-spaced pages); the size is 175,000 characters (approximately 66 single-spaced pages) with 256K RAM. You can create word-processor files from scratch or from any ASCII text file, such as ones you create with the Pascal editor or Apple Writer. Since various utility programs are available that translate files from one format into another, a little bit of juggling can open 3EZP to information from many diverse sources. The program can accommodate up to three different printer specifications at one time, which, for example, makes it easy to feed text to a dot-matrix printer and then reformat it for a daisy-wheel. When you choose a printer from the menu, 3EZP automatically makes the necessary adjustments to assure correct platen width, paper feed, line feed, and so on.

The program anticipates most printer features—including proportional spacing, subscripts, and superscripts—and changing the pitch is as easy as setting the margin. People who are not well versed in the art of customizing printer drivers, using the SOS utility disk, may run into problems here, but that is the nature of the beast rather than the program's fault. Screen dumps, on the other hand, are painless—you just use an open-apple/H combination. Moving or copying blocks of text, up to 250 lines at a time, is also simple; you can perform these manipulations within a file or from one file to another.

Rife as 3EZP is with features, perhaps the most salient quality of its word processor is that you hardly need to consult the manual in order to use this part of the program to full advantage. A listing of most commands and options is at your fingertips, and mnemonic design helps you remember them.

Figures

I spend just about all my days writing and have used more word processors than I care to remember, but I have devoted relatively little time to exploring spreadsheet programs. Nevertheless, I was able to get much further with the 3EZP module than I ever did with VisiCalc or SuperCalc. I may have made good progress because this program has fewer features than the others, but I am more inclined to credit it to 3EZP's take-you-by-the-hand design. Again, here is a program that impresses with its size and scope. The maximum number of cells it can hold is 3100 *filled* cells for a computer with 128K RAM and 11,000 for the 256K version; this capacity translates into a maximum of 127 columns and 999 rows, for a total of 126,873 *empty* cells. These figures exceed the limits of such spreadsheet leaders as VisiCalc, SuperCalc, and Multiplan.

Perhaps the most salient quality of its word processor is that you hardly need to consult the manual.

The worksheet's notable features include the ability to change column width (2 to 75 characters), insert rows and columns, change the cell layouts, protect specific cells (labels and/or values), and split the screen vertically or horizontally (with flexible boundaries). You can work on the windows of a split screen individually, so that only the part that houses the cursor moves, or you can synchronize them to work in tandem. The worksheet contains six standard value formats: Dollars, Commas, Percent, Appropriate, Fixed, and Standard. Open-apple/Z toggles between display of values and formulas, an essential feature that helps you study the entries and results of the arithmetic, logical and financial functions you enter on the supplied data disk's sample worksheets.

As in other 3EZP modes, vital file information often appears at the top of the screen and help information at the bottom—a list of the current settings is never more than a keystroke away. Once you have prepared the worksheet, 3EZP is ready to print reports, and here the program's flexibility and ease of use are again impressive. You can also design reports for inclusion in text you create with 3EZP's word processor, and making the transfer is extraordinarily easy.

One handy feature of 3EZP lets you print data to a disk as ASCII (text) files or DIF (Data Interchange Format, a VisiCalc standard) files for later transfer to a printer through other programs, such as the Pascal Filer or the system utilities. Such a transfer can be a little tricky because of the device drivers involved, but the advantages can easily outweigh any frustrations you might encounter.

Facts

Assuming an average record size of 75 characters, 3EZP database files have a capacity of up to 625 (with 128K RAM) or 2300 (with 256K RAM) records. Each record can contain as many as 30 fields with a maximum of 1024 characters. That amount is not overwhelming but certainly enough for many applications, such as a modest mailing list or—as one of the program's sample files illustrates—a users' group or club file. Here, again, the open-apple/Z keystroke combination zooms in for a closer look, devoting a full screen to details of data otherwise contained in one line.

Creating a new database file is a straightforward procedure, and although you should always plan ahead, 3EZP makes it easy to change a file's structure anytime. Entering new information is simplified by the program's ability to duplicate previous entry or set a standard value that remains throughout a field until you change it. If a field name contains the words *date* or *time*, dates and times automatically convert to a standard format, which eases the task of entry and results in a neater file. Here are some examples of entries and the results:

Entry	3EZP Conversion
700	7:00 AM
7p	7:00 PM
659	6:59 PM
1500	3:00 PM
3 84	Mar 84
5/12/84	May 12 84
18October8	Oct 18 84

Notice that 3EZP converts 24-hour (so-called military time) to 12-hour time. Also, the program assumes that all hours you enter are normal daytime

hours, so you have to add either *a* or *p* if you want to indicate other times.

Sorting and searching are quick and easy with the 3EZP database, and few programs of this kind are as uncomplicated for creating report formats. You can save existing formats for reuse or duplicate them for use with other files, and an excellent built-in labels format puts some dedicated mailing-list programs to shame. As one might expect from such a thoroughly considerate program, the 3EZP database report module also has provisions for manipulating and calculating numerical data to yield totals, sale percentages, and the like. All in all, the database is an impressive addition to a program that just might become the most useful piece of software you run on your Apple III.

The database is an impressive addition to a program that just might become the most useful piece of software you run on your Apple III.

The accompanying disk of sample files contains useful demonstrations of applications for all three main modules, each sample displaying a different approach. The manual, which also contains step-by-step instructions for installing 3EZP on the ProFile hard disk (with the Quark Catalyst or Habanet systems) is well written, thoughtfully laid out, and carefully indexed.

With the Macintosh in full bloom, it may seem a little late for serious business-minded computer users to discover the virtues of the Apple III, but it continues to be a superb machine. III E-Z Pieces just might change some minds and do for the III what VisiCalc did for Apple II and Lotus 1-2-3 is doing for the IBM PC. +

PRODUCT INFORMATION

III E-Z Pieces
Haba Systems, Inc.
15154 Stagg Street
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(818) 901-8828
Suggested Price: $295
Requires: Apple III or III Plus with parallel printer; external disk drive or ProFile recommended

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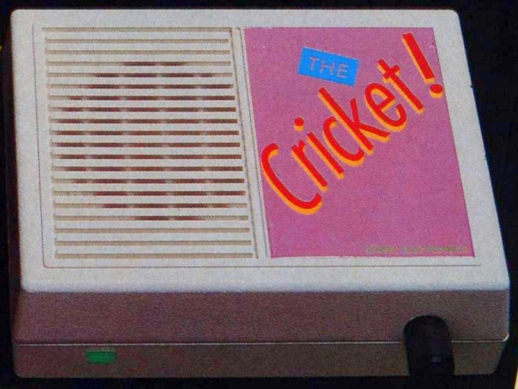

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CIRCLE 178 ON READER SERVICE CARD

NOW YOU CAN CREATE ULTRA HI-RES GRAPHICS ON YOUR APPLE

NUMBER NINE BOARD

Beauty, goes the saying, is in the eye of the beholder. That's why one of the biggest reasons for the Apple II's early popularity was its capacity for fast; colorful; and, above all, *affordable* graphics. The eight colors of the Apple high-resolution screen—eight, that is, if you counted both blacks and both whites—were a spur to the imaginations of designers and consumers alike.

Game programs got wilder; business programs drew on increased graphic power to display and analyze information; and all over the world, wherever there were Apples, a new generation of artists began expressing their visions with pixels instead of paint. But there were still certain—problems.

Resolution, for one. At 280 pixels wide by 192 pixels high, the Apple hi-res screen wasn't truly "hi-res:" "jaggies" and stair steps abounded. In addition, the colors interfered with one another in ways that were sometimes difficult to predict. Finally, there was the matter of those colors themselves and how utterly boring an unrelieved diet of white, black, blue, orange, green, and purple could become.

The eye, like the palate, hungers for variety, but while time and technology have marched on, Apple graphics have remained, sadly, much the same.

Until now.

Want a brand new standard? All you have to do is add a Number Nine Graphics System Board to your Apple II Plus or IIe, connect the board's cable to an RGB monitor, and you've got a quantum leap in microcomputer-graphics sophistication.

It's so different, in fact, that at first you may have a hard time believing what you see—real reds, for example, and *yellow*. And curves that betray only the faintest ghostly hints of the jaggies, if they show any at all. And no color anomalies!

Some Specs

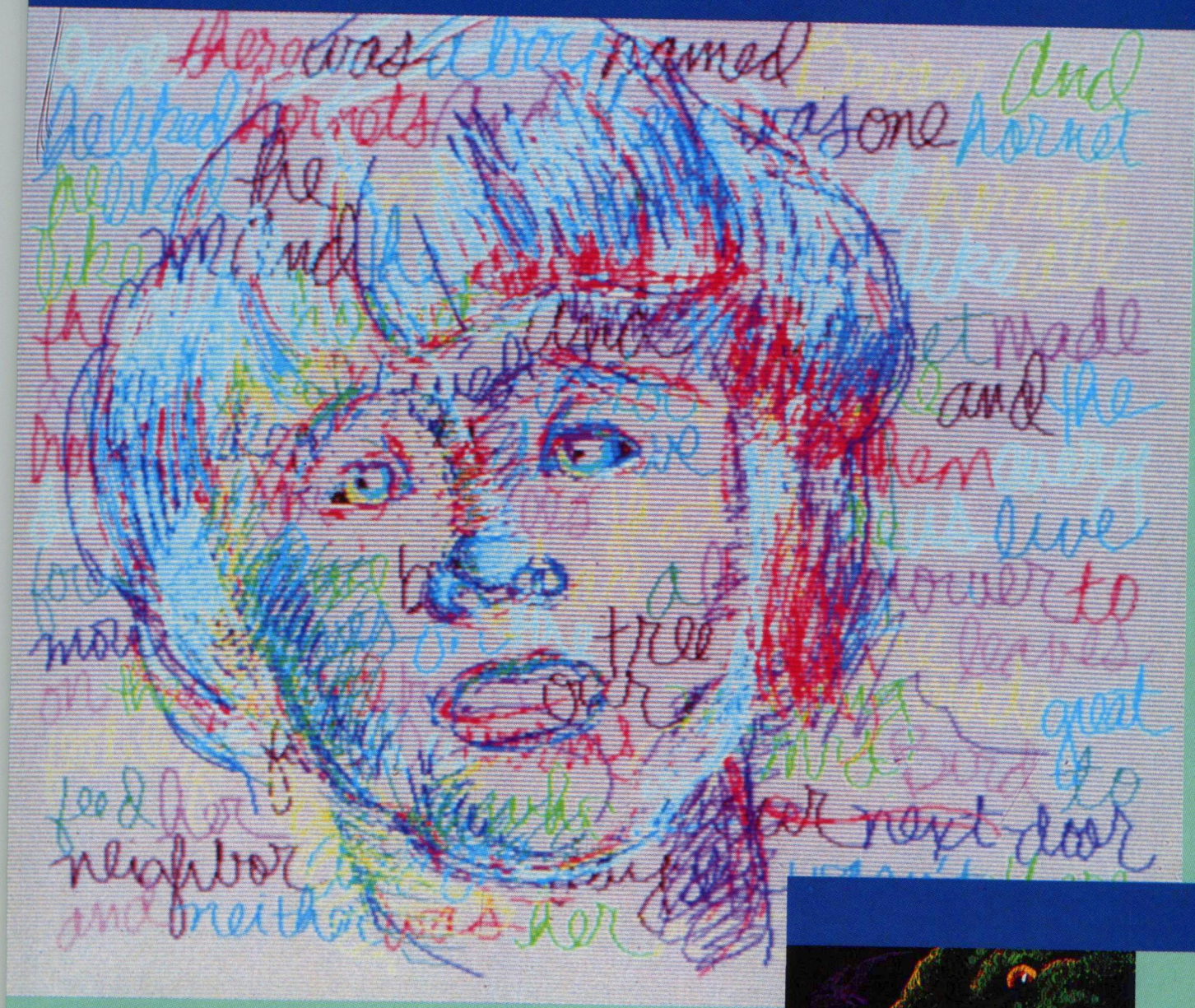
In its simplest, most basic, configuration, the Number Nine Board gives you 16 colors simultaneously and a resolution of 512 × 512. (That's nearly as high as the 525-scan-line resolution of American television.) The colors you get to play with are black, white, dark gray, light gray, red, light red, green, light green, brown, yellow, blue, light blue, magenta, light magenta, cyan, and light cyan. If you need higher resolutions than the 512 × 512 version offers, you can obtain them by giving up colors. Configurations are available that offer four colors with a resolution of 724 × 724, or two colors with a resolution of 1024 × 1024. The latter is even higher-res than a feature film! The 724 and 1024 grid configurations require special (and therefore relatively expensive) monitors.

You don't have to limit yourself to a mere 16 colors. Sixteen colors simultaneously, yes, thanks to the way that your Apple accesses memory—but not just the 16 listed above. If you add an RGB Analog module to your Number Nine Board, you can select the 16 colors from a palette of 4096. And if a few thousand shades and hues still aren't enough to satisfy you, then you can link up multiple Number Nine Boards to get a color palette with more than 16 *million* choices.

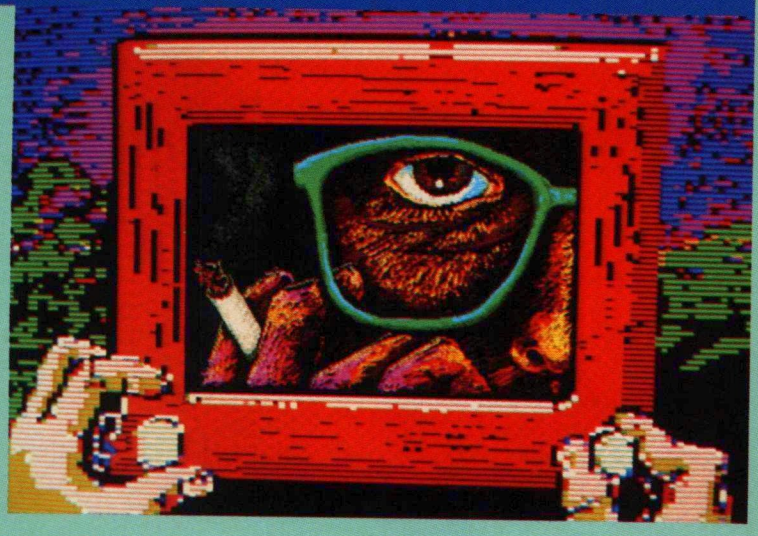
The Number Nine Board is actually a 16-bit coprocessor for your Apple, whose brain is a NEC 7220 VLSI Graphic Display Controller microprocessor, abetted by 128K of on-board RAM. You need all that RAM to handle a single picture, because the Number Nine Board actually deals with an image as the product of four visual planes, one each for red, green, and blue—the primary colors of light—and a fourth for intensity level.

The NEC 7220 chip itself is a mixed blessing. It was designed as a dedicated device, so the hardware of the chip itself automatically does many of the graphics calculations that software always used to take care of before. The design choices both strengthen and weaken the chip's capabilities. At some things, such as drawing circles, it's an absolute speed demon. At others, such as filling in circles or moving shape tables fast enough for arcade-style action, it is not. What it does, however, it does very well, and the hardware and software engineers who have been working with it during the last two years have managed to find ways to minimize its deficiencies.

Two of those engineers are Stan Bialek, 29, and Andy Nhada, 28, the founders of the Number Nine Com-



'Bevan and the Hornets,' 'Tyran,' and 'Methinks' (©1984), created by Lauretta Jones, demonstrate the Number Nine board's palette of colors and the 512 x 512 resolution.



puter Corporation. Bialek in particular has always been fascinated by graphics, but he couldn't afford to buy the kind of resolution and speed he wanted. "You had to spend tremendous amounts in order to do anything constructive," he recalls. "So the ideas we were pursuing made it necessary for us to play around with our own hardware and investigate different schemes and approaches."

The key, as soon as it became available, was the NEC 7720. Work on what was to become the Number Nine Graphics Board actually began in 1980 but was sidetracked for a time by another project, the Accelerator II board. Bialek and Nhada licensed the latter board, which enjoys the reputation of being one of the best pieces of Apple add-on hardware ever designed, to Titan Technologies.

The Graphics Board itself was finally premiered at the 1982 San Francisco Applefest. At the time, the only software available for it was machine-language interpreter and a relatively simple infinite-loop demo. It was enough to show people that something new and interesting was in the Apple world, though, and some software developers took note.

Still, that was two years ago, and it's surprising that a hardware product this exciting has had as little impact on the field as it has had.

Software for the Number Nine Board may have been slow in coming, but it was well worth the wait. Products that should be available by the time you read this include the following:

- A new enhanced version of CAD/APPLE, the popular computer-assisted-design and drafting tool from TW Systems, that will take advantage of the Number Nine Board's increased resolution and greater number of colors.
- A "preview" system for typesetters and type designers from 21st Century Typesetting, which will use the board's 1024 × 1024 two-color configuration and special monitors to allow people, such as designers, buyers, and typesetters, to see exactly what a chosen typeface, leading, and layout will look like before it is set.
- Meta-Logic from Artemis Systems, Inc., will combine the power of the Number Nine Board with Sub-Logic A2-3D2 design software, enabling you to program three-dimensional simulations in more colors and with higher resolution than ever before.
- An Apple Pascal driver with turtle graphics, designed by Scott Steketee of Philadelphia.
- A relatively comprehensive set of five different-but-related graphics packages from Visual Data Enterprises in Los Angeles. The set includes VPAINT, an electronic paint program that you can use with a joystick, the Apple Graphics Tablet, or other Apple-compatible tablets; VSCAN, which works with a black-and-white video camera to let you digitize video images with Number-Nine-Board resolution; VTYPE, a character-set-design program; VPRINT, which lets you print out hard copies of Number-Nine-Board images on a variety of graphics printers; and VPRIMITIVES, a set of assembly-language subroutines that are accessible through the BASIC ampersand commands. These subroutines allow you to program the Number Nine Board directly, in BASIC, instead of forcing you to dig into the Apple monitor and write line after line of hexadecimal code.

Nick Pavlovic, the founder of Visual Data Enterprises (and president of the Los Angeles chapter of SIGGRAPH) was one of the people who saw the Number Nine Board at the Applefest that was its first public outing. He was hooked. Shortly after that, he became the first person on the West Coast to have one.

"Working from the manual," says Nick, "and with a little help from a few phone calls, . . . I was able to make the board do a few simple things, using poke commands from BASIC—draw a box, draw a circle, that sort of thing. Then I went on to write a quick-and-dirty interactive system, just to demonstrate that it was usable. I'd always been looking for an affordable board, and when I finally found it, I wanted to see if I could pull some people with like feelings together and do something nice with it."

As it happened, he could. First on board were Eric Popejoy (an assembly-language programmer and the creator of the Superscan package that Microworks markets along with its DS-65 Digisector board) and Barry Wood (a computer student and primary author of the VPAINT package). Soon to follow were a group of people who ranged from more students, such as Alan Somen and Voldi Way, to professionals with ten years of mainframe experience such as Sandy Murray. Together they've created a set of software tools that, by accessing the strengths of the Number Nine Board (and inventively ducking around its weaknesses), have advanced microcomputer graphics to an unprecedented degree.

Ten years ago, graphics like those you can create with the Number Nine Board were possible only on supercomputers. As recently as two years ago they were possible only in minicomputer installations costing $30,000 and up. But now, if you spend as much money as you had to pay for the IIe starter set until Apple lowered the price in April, you can add a Number Nine Board, a graphics tablet, and several well-chosen software packages to your system.

The system I got a chance to test consisted of the 512 × 512-resolution board and an RGB Analog module. Since both the board and the module have cables, I was able to experiment with two different video outputs. I ran the RGB-TTL signals from the board itself to a Taxan VISION 420 monitor, using an IB PC-style cable. (The right cable is critical. This particular output creates its colors with signals that individually control red, green, blue, and intensity. Unfortunately, some monitor cables don't allow for the intensity signal, and without it you can get only 8 colors at a time instead of 16.)

The RGB Analog module required something a bit different, because it has three separate-but-equal video outputs, meaning that each output has a cable of its own. Thus, you have to connect the Analog module to a monitor with separate control inputs for its red, green, and blue color guns, such as the Amdek Color IV.

With everything connected—and four new cables added to the snake nest inside my Apple—I was ready to insert the interpreter disk that comes with the Number Nine Board, boot the system, and go.

After years of working with Apple hi-res, I was really impressed by curves and colors such as I'd never seen before and screen images that could have been painted by Vasarely.

All the exciting stuff was on the screen of the Taxan monitor, though, the one that was taking its signal from the board itself. On the Amdek Color IV, the same images were whirling by, but in a rather boring palette of light blues, yellows, and chartreuses, some so similar to each other that I couldn't tell them apart.

After glancing over the documentation that came with the Number Nine Board, I realized that to operate the

RGB Analog module, prior knowledge of Apple assembly language—which I didn't have—was necessary.

So instead I went ahead and tested two of the Visual Data Enterprises programs, VPAINT and VPRIMITIVES.

They were more my speed. VPAINT is like a standard electronic paint program, with a few extra touches and some quirks that come from limitations in the NEC chip on the Number Nine Board itself. (It doesn't let you design your own "brush" for drawing, for example.) On the whole, it is a delightful package, though, and I was pleased that it allowed me to call up images created with standard Apple hi-res packages and then alter and refine them in this higher-res mode.

VPRIMITIVES is simply all the Number Nine Graphics Interpreter commands, recoded so that they work through ampersand commands in BASIC. The following three-line program, for example, creates a simple set of 16 color bars on the screen:

```
10 FOR A0 TO 15
20 & FILLO, 80 +A*20, 1, 5 12, A
30 NEXT A
```

I could have gone on forever, happily exploring this new land of graphics, using just these tools. But I wanted to design colors, too. With VPAINT I could access the range of 4096 colors available from the RGB Analog module, with the Random Palette command, but I could never predict what I was going to get. I wanted a choice! (Newer versions of VPAINT provide mechanisms that get around this problem, but the version I was working with did not.)

So I kept going back to the Number Nine manual and some books on assembly language, and finally I called the Number Nine Computer Corporation itself to find out how to use assembly language to achieve the flexibility I desired.

Nothing I had ever encountered in software or hardware had been tantalizing enough to make me dig into assembly language, but once I'd started, the first steps proved pretty easy. A CALL-151 command put me into the Apple's monitor, and then all I had to do to create any custom color palette I could imagine was to type in a string of numbers at the appropriate memory location for each individual color gun and blend colors together.

Each gun was intensity-adjustable in 16 levels (from O to F hexadecimal). Setting all three guns to F, the greatest intensity, created white in that slot on the RGB Analog module's lookup table, and setting them all to O left me with black. The possibilities for different shadings were extraordinary. With three color guns and 16 intensities, you do have 4096 possible colors, and I must have explored at least a third of those before I got tired of typing in strings of numbers and started to consider writing my own subroutines to step through the process for me.

Thus, I was hoodwinked into taking the first steps toward computer freedom, toward being in control of my computer instead of passively working within the limits of the software someone else had written.

Beauty is in the eye of the beholder, I said, back when we began. That's how the saying goes. And inspiration is in the heart. It was the way that graphics caught the eye and fueled that inspiration that made them a major force in the explosion of the microcomputer industry. Judging from my own personal experience, the direct result of magically improved graphics will be even more beauty, and even more inspiration, for all of us. ✚

PRODUCT INFORMATION

All the products below require the Apple II Plus or IIe; 64K RAM; and at least one disk drive.

Number Nine Graphics System Board
Number Nine Computer Corporation
691 Concord Avenue
Cambridge, MA 02138
(617) 492-0999
Option 1 (interlaced video) boards
16 colors, 512 × 512 resolution:$895
4 colors, 720 × 720 resolution:$945
2 colors, 1024 × 1024 resolution: $1195
Option 2 (noninterlaced video) boards
16 colors, 512 × 512 resolution: $1095
4 colors, 720 × 720 resolution:$1195
Analog RGB Module (provides choice of 16 colors from palette of 4096):$295

VPAINT, VTYPE, VSCAN, VPRIMITIVES, VPRINT
Visual Data Enterprises
P.O. Box 30563
Los Angeles, CA 90030
(213) 250-4977
VPAINT: $295 (works both with and without Analog RGB Module)
VTYPE: $150 (includes two font disks with ten fonts each; additional font disks are available at $50 each)
VSCAN: $195 (requires MicroWorks Digisector board and black-and-white video camera)
VPRIMITIVES: $95 (BASIC)
VPRINT: $95 (supports Epson MX-80 and 100, Epson FX-80 and 100, NEC 8023, Amdek DP-9500 and 9501, IDS Prism, and Diablo Ink-jet printers; call for updated support list)

GRAPHICIAN RGB
Artemis Systems, Inc.
41 Parkview Drive
Millburn, NJ 07041
(201) 564-9333
List Price: $149.95 (package includes 2-D and 3-D capabilities, 16 colors with Option 1 board, complete manual and tutorial, and smooth dual-page type-animation effects)

CAD/APPLE
T&N Systems, Inc.
7372 Prince Drive, Suite 106
Huntington Beach, CA 92647
(714) 963-3913
List Price: $1995 (version compatible with Number Nine Board)

Pascal Graphics Toolkit
By Scott Steketee
Available through Number Nine Computer Corporation
691 Concord Avenue
Cambridge, MA 02138
(617) 492-0999
List Price: $200 (toolkit consists of two modules, Turtle.Library and Pascal.Primitives).

Laser Master and **Interwriter**
(Typesetting preview systems)
21st Century Typesetting
30 La Salle Road
Hillsborough, CA 94010
(415) 342-5037
Call for prices and availability.

Some Compatible Monitors
Amdek Color IV, $995
(312) 364-1180
Amtron 1308, $1500
(408) 688-4445
Aydin Controls 8810, $1800
(215) 542-7800
NEC JC1410P2A, $998
(312) 228-5900
NEC JB1410P2A, $249 (monochrome)
Princeton Graphic SR12, $995
(609) 683-1660
SONY PVM12700, $915
(201) 930-1000
Taxan Vision 420, $630
(213) 357-9991

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Tecmar's Mac Drive gives you a 10 megabyte fixed hard disk or a 5 megabyte removable hard disk. You can add a 5 megabyte removable hard disk to either of the above.

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- Your Macintosh runs much faster than with the built-in floppy.
- Mac Drive will provide up to 38 times more storage than floppies.
- You can minimize the use of floppies.
- You can access files and save time by loading programs from Mac Drive.
- You can take your removable Mac Drive cartridge with you for added security.

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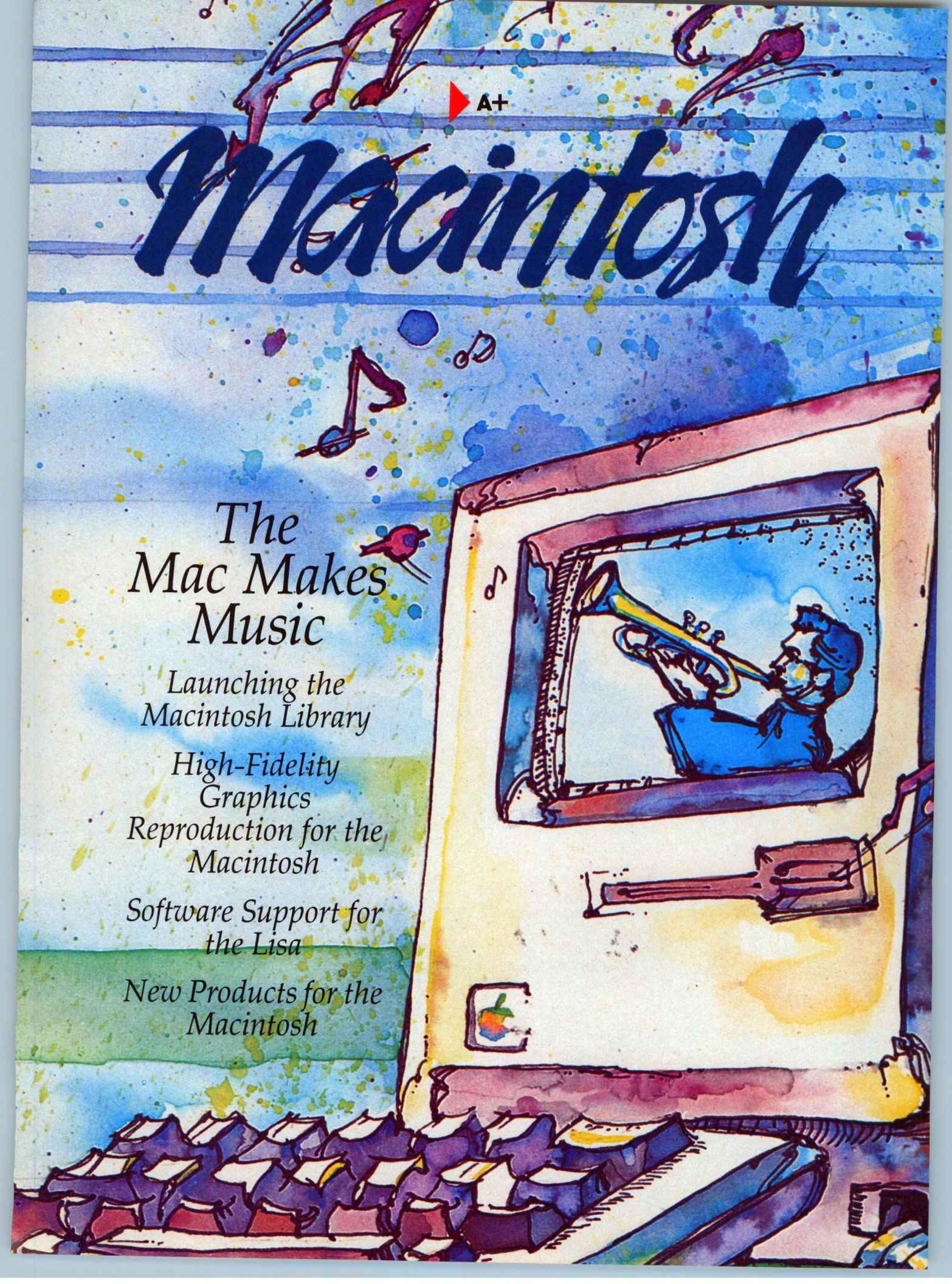
CIRCLE 205 ON READER SERVICE CARD

A+

Macintosh



The Mac Makes Music

Launching the Macintosh Library

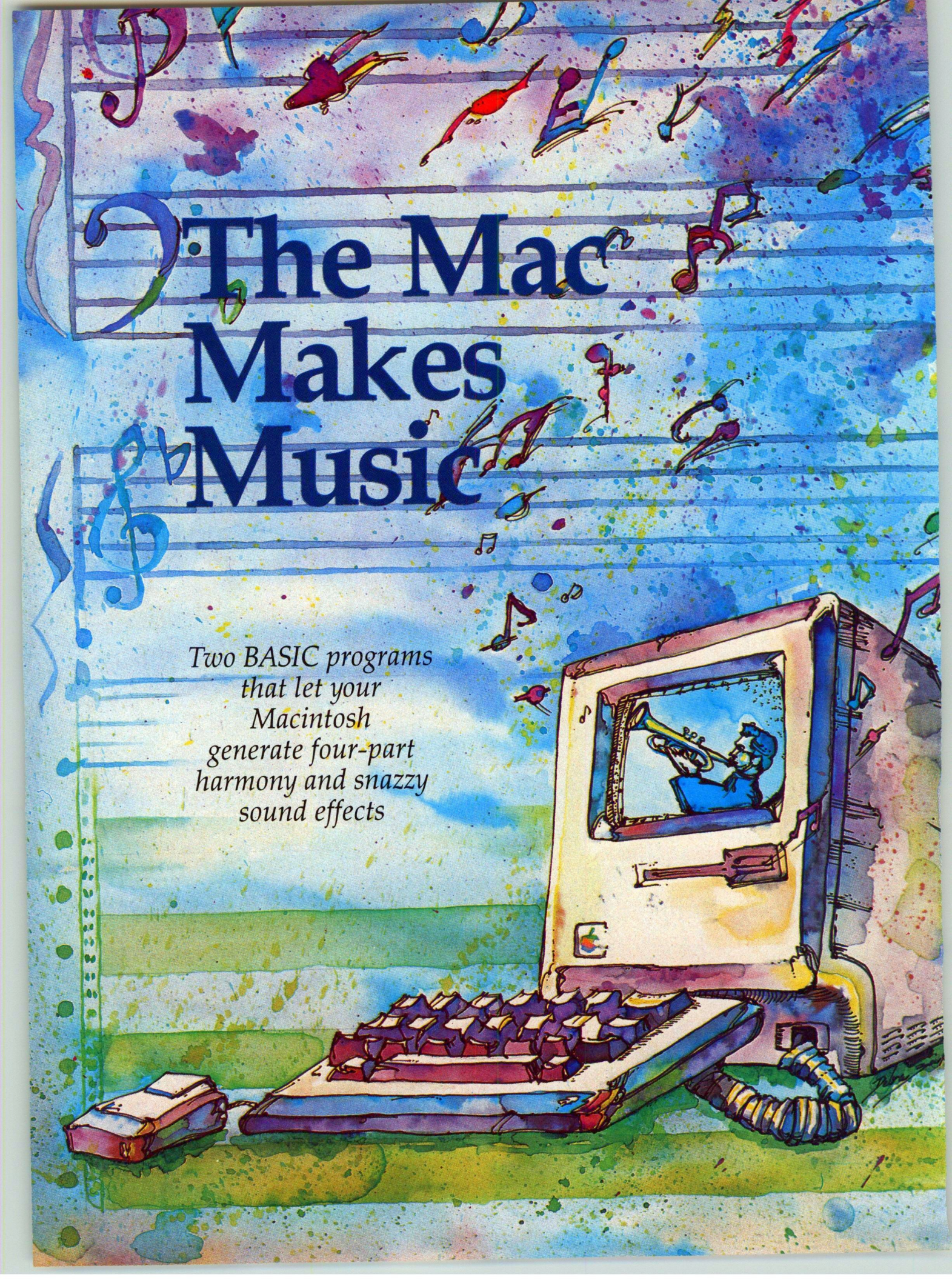
High-Fidelity Graphics Reproduction for the Macintosh

Software Support for the Lisa

New Products for the Macintosh

The Mac Makes Music

Two BASIC programs that let your Macintosh generate four-part harmony and snazzy sound effects



Eavesdrop on a gathering of Macintosh owners, and it won't be long before you hear somebody ask how to produce music and sound with the Mac. Everybody, it seems, has read about the sophisticated sound capability built into the Macintosh, and the department-store chime you hear when you turn the Mac on hints at great things. Information on how to use it has been hard to come by, though. Even the Macintosh technical manuals available have only a brief, incomplete section on sound (and some of the information that *is* there is just plain wrong). The available information does provide a starting point, however, and a little experimentation soon reveals all.

In this month's column I'll start to pass on what I've learned about Macintosh sound and present a couple of programs that show how to create music and sound effects on the Mac (see page 78). I wrote both programs in Microsoft BASIC—at this writing, it's still the only readily available programming language for the Macintosh. For the hackers in the audience, I've included a brief description of how the Macintosh sound hardware works.

Calling the Sound Routines

The Macintosh operating system (in ROM) treats the sound generator as an ouput device, so you get sound by having the program call the Write routine contained in the ROM. The two forms of Write call are *synchronous*, in which control does not return to the program until the Write operation has been completed, and *asynchronous*, in which control returns immediately, and the Write operation takes place in parallel with the operation of the calling program.

When you call the Write routine, you must hand it a standard 50-byte input/output parameter list. You need to fill only a few fields in the parameter list in order to generate sound: the word (two bytes or 16 bits) at byte offset 24 must contain the "reference number" of the sound device (-4); the longword (four bytes, 32 bits) at offset 32 must contain the address of a "synthesizer record," and the longword at offset 36 must contain the length (in bytes) of the synthesizer record. When you do an asynchronous Write, you can monitor the word at byte offset 16 of the parameter list to determine when the Write operation has finished—the initial Write call will set it at a nonzero value, and it will go to zero when the operation finishes.

The wizards at Apple have provided ROM routines for generating sound in three different ways: "square-wave" tones, with automatic sequencing from tone to tone; "free-form" synthesis of sound patterns of arbitrary shape and length; and "four-tone" synthesis of music with up to four individual voices, each voice having its own user-specified waveform. The format of the synthesizer record the Write parameter list points to determines which type of sound the computer will generate.

Square-Wave Sound

Square waves have a characteristic "electronic organ" sound, similar to much of the music earlier microcomputers such as the Apple II play. Generating this kind of music on the Macintosh is particularly easy, because you can encode an entire tune into a single synthesizer record and then tell the Mac to go off and play it while your program goes about its business.

A square-wave synthesizer record consists of a mode word containing any negative number (to indicate square-wave synthesis), followed by a triplet of words for each note. The

DEBRA ZINK

first word of the triplet sets the note's pitch in an indirect way—the number in this word specifies the time for one square-wave cycle, in units of 1/783,360 second. Since we usually think of pitch in terms of frequency, you should set this word to 783,360 divided by the desired frequency. The second word of the triplet sets the volume of the note, in the range 0–255. The third word sets the note's duration, in units of "ticks" (there are 60 ticks per second), up to a maximum of 255 (4.25 seconds).

Listing 1 is a Microsoft BASIC program that uses square-wave synthesis to play a tune. The tune is encoded in DATA statements at the end of the program, using familiar musical notation (REM statements in the program give the details of the coding scheme). The program contains a set of machine-language subroutines (invoked by the CALL statement) for word and longword peeks and pokes and access to the ROM Write routine. I designed the program to be easily extensible—it is a simple job to modify it to read the tune it is going to play from an external data file, for instance. You can also incorporate the central music-playing routine into another program, to add music to that program.

Free-Form Sound

The free-form-sound synthesizer gives you almost complete control over the Macintosh sound system—you use this feature to create those beeps and fweeps and explosions so necessary in arcade-style games. You can set up any waveform. Just a few of the possibilities are asymmetric square waves (for special tone quality), wave patterns with varying pitch (for "phaser" and "falling bomb" effects), or random patterns of various kinds (for gunshots and explosions).

The free-form-synthesizer record consists of a mode word of zero, followed by a rate longword, followed by an array of bytes that specify the waveform. The rate longword determines the rate at which the Macintosh steps through your waveform array. It is a fixed-point binary number, with the binary point between the high and low words of the longword, representing the number of array bytes the program steps through during each 44.93-microsecond synthesizer interval. A couple of examples may help here: A longword value of 65,536 means a rate of 1.0, causing the sound system to step to a new byte of your array every 44.93 microseconds (thus stepping through 22,255 bytes per second); a value of 4096 is a rate of 1/16, causing a step every 16×44.93 or 719 microseconds (1391 bytes per second). Values greater than 65,536 (rates greater than 1.0) are not generally useful, since they cause the program to skip bytes in the waveform array.

The Macintosh sound hardware has the simple-but-elegant flavor that is characteristic of the rest of the Macintosh design.

The waveform array is just a series of bytes specifying the amplitude of the waveform (in the range 0–255) at successive instants. It makes up the balance of the synthesizer record—the record length plugged into the Write parameter list is 6 plus the length of the waveform array (in bytes).

Listing 2 is a program that uses free-form synthesis to produce an explosion effect. (Note that the listing requires lines 6000–8350 from Listing 1). A 4096-byte waveform array is filled with random values whose range is constrained by a "decay envelope"—the values may have a maximum range of 0–255 at the beginning of the waveform, with the allowed range (and therefore sound amplitude) decreasing steadily throughout the array. The random values produce "white noise," and the sudden onset followed by the decay gives an explosion effect. By varying the synthesizer rate and the length of the waveform array, you can get an effect that ranges from gunshots to nuclear explosions.

To try out other sound effects, you can modify the program code in lines 5000–5080 by putting other waveform patterns into the synthesizer record. You can incorporate the basic free-form-synthesis procedure in any program that needs sound effects.

Four-Tone Synthesis

You use four-tone synthesis for serious music generation, with up to four-part harmony and four different instrumental "voices." You can simulate real musical instruments with reasonable accuracy or create tonal qualities like those of no instrument you've ever heard.

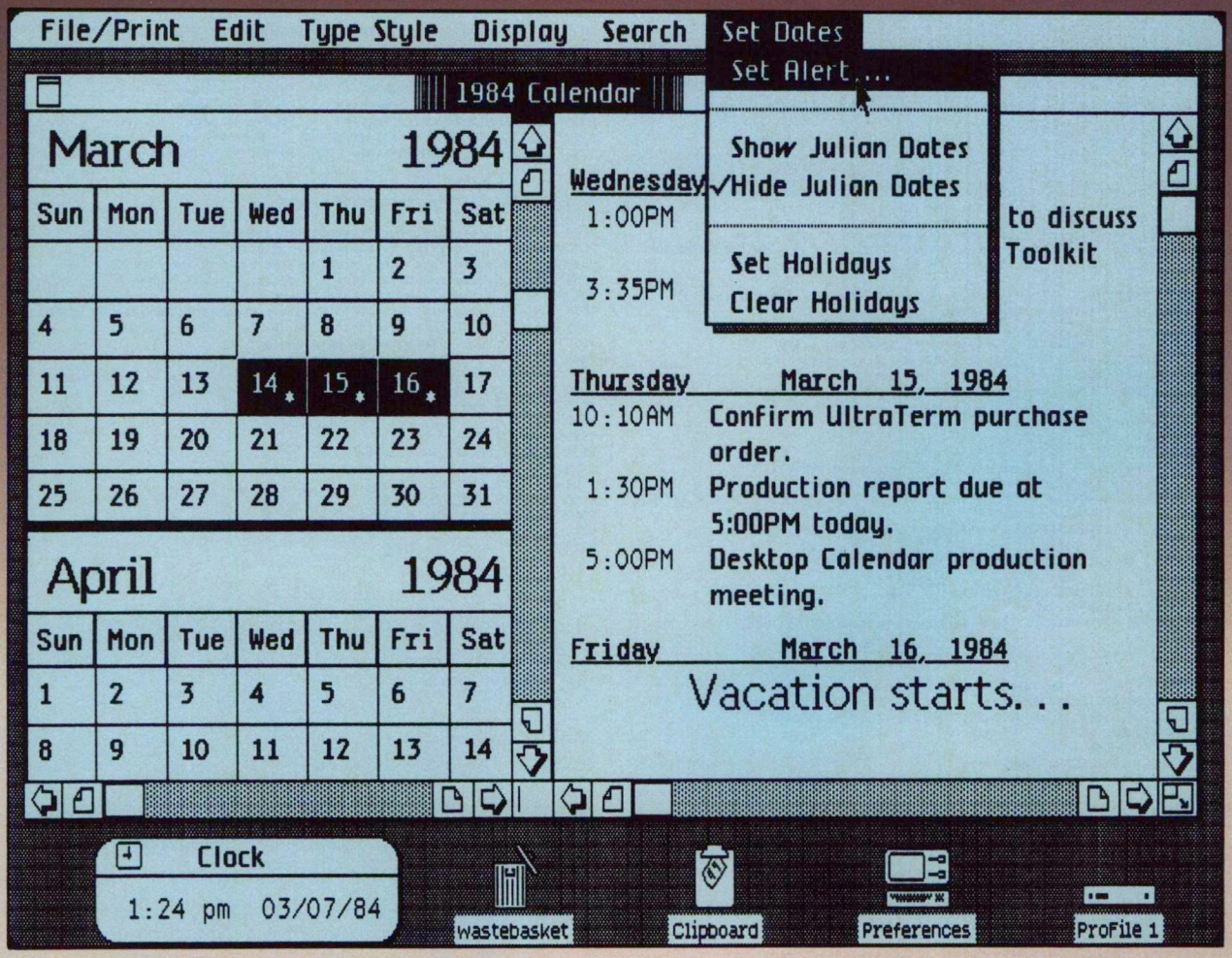
The four-tone-synthesizer record consists of a word containing a positive number, followed by a longword containing the address of a "sound record." The sound record begins with a word containing the tone duration (in 1/60-second ticks). Next come four pairs of longwords, one pair for each tone. The first longword of each pair determines the rate at which the program steps through this tone's waveform table (see description above under free-form synthesis). The second longword determines the initial phase of this tone (which byte of the corresponding waveform table the program will access first). The sound record ends with four longwords that contain pointers to a 256-byte waveform table for each tone. More than one tone may use the same waveform table, if you want them to. A waveform table generally contains the amplitude profile for one complete cycle of the desired waveform. You usually set a tone's rate longword to 753.88 times the desired frequency.

Macintosh Sound Hardware

The Macintosh sound hardware has the simple-but-elegant flavor that is characteristic of the rest of the Macintosh design. It consists of a 370-word array of Macintosh memory that is cycled through in synchronism with the screen-display process. At the end of each horizontal sweep on the screen, which occurs every 44.93 microseconds, the program retrieves the next word in the array (the system automatically wraps around from the end of the array to the beginning). The program treats the high-order byte of that word as a number (which can range from 0 to 255), and converts it to an electrical voltage proportional to that number. This electrical signal drives the Macintosh's speaker. By plugging the proper sequence of values into the memory array (always staying at least one step ahead of the retrieval process), you can get almost any desired electrical waveform (and therefore sound waveform).

The Macintosh has two additional hardware sound controls, an eight-level "volume control," and a device that will repetitively switch the sound generator output on and off at a specified time interval, generating a square-wave if the sound array has been filled with a constant value.

INTRODUCING



Desktop Calendar for your Lisa 2

Desktop Calendar, a new tool for the Lisa 2, will improve the way you work because it helps you manage your time.

Your're an important person. Working hard to get the job done. But what happens if you get so involved in your work that you lose track of time? Missing an important appointment or meeting can mean disaster.

If you put the times and dates of all your important appointments and meetings into Desktop Calendar, it will automatically remind you of them in time for you to meet your commitments. Once you place Desktop Calendar on your electronic desktop, you can use your computer to write a letter, recalculate a schedule, prepare a financial statement, or use any of the Lisa Office System Tools. At the proper time Desktop Calendar will interrupt, reminding you of your appointment.

Talking on the phone to an important client? Want to know all the dealings you've had with them for the last three months? Desktop Calendar will search through its electronic notebook and tell you. Want to know the address of an important business contact named 'JONES'? Desktop Calendar will tell you that too.

Desktop Calendar is more than just a calendar for your computer. It will also keep track of appointments, hold addresses for easy reference and remind you of important events, even when you are busy working with another tool in the Lisa Office System.

Desktop Calendar will be available third quarter 1984 from Videx.

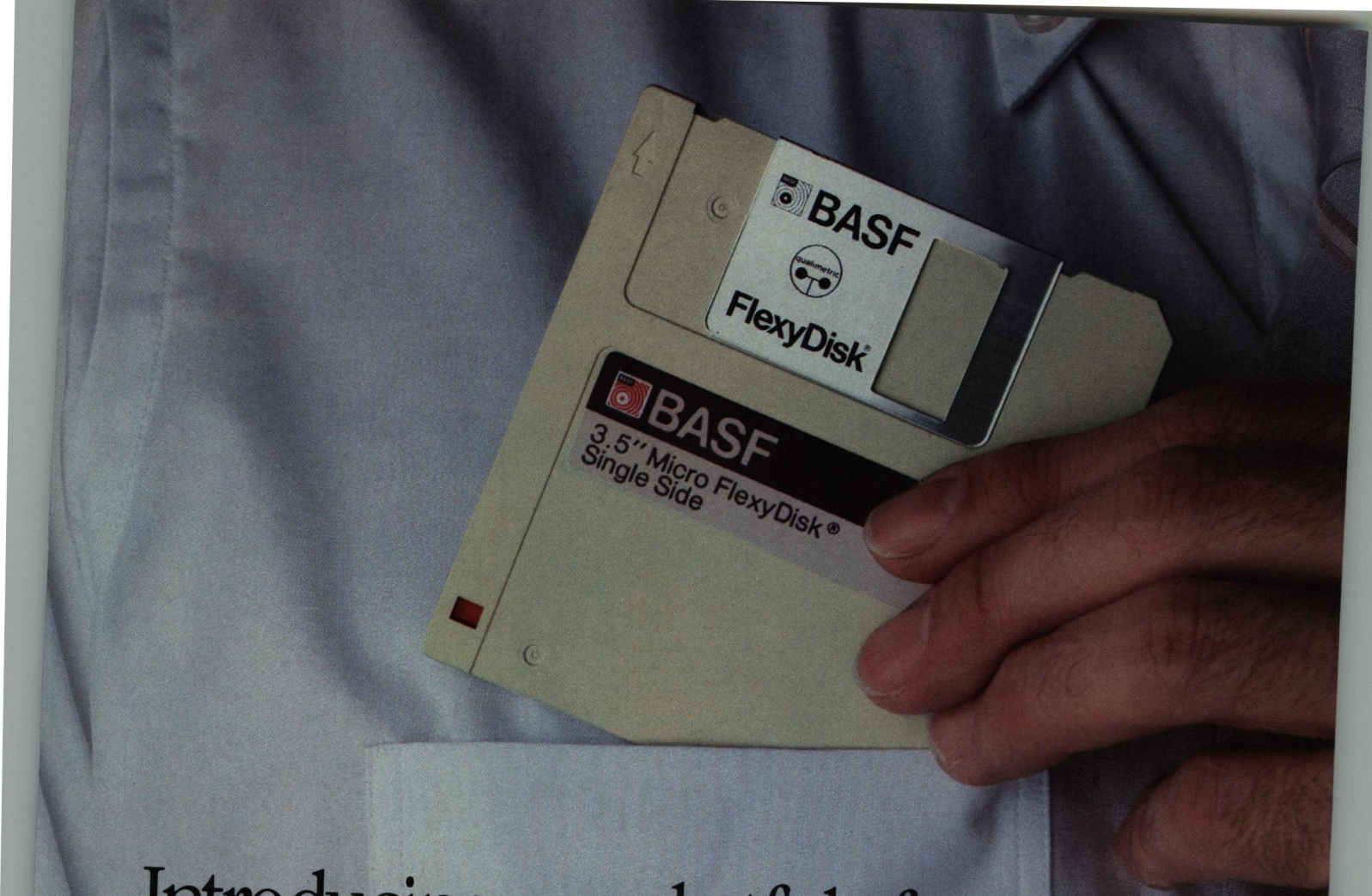
Videx Inc.
1105 N.E. Circle Blvd. • Corvallis • OR 97330
503 758-0521

CIRCLE 141 ON READER SERVICE CARD

```
1000 REM  Demonstration of Macintosh square-wave sound generation
1010 REM    Dennis F. Brothers - CompuServe 70065,172 - MCI Mail DBROTHERS
1020 REM    Copyright (c) 1984 - Brothers Associates, Wayland, MA
1030 CLS
1040 PRINT: PRINT "Macintosh Square-Wave Synthesizer Music Demonstration"
1050 PRINT: PRINT "Initializing - Please wait....."
1060 REM
1070 DEFINT A-Z  '  Default to integers for speed and space
1080 DIM PARAMLIST(49\2)  '  Standard ROM Write parameter list
1090 DIM SYNTHREC(100*3)  '  Allow for 100 notes
1100 GOSUB 8000  '  Go initialize the machine-language subroutines
1110 REM
2000 REM  Build the tone frequency table
2010 REM
2020 PRINT: PRINT "    Building the tone tables....."
2030 DIM NOTEFREQ#(87)' '  Simulate a piano keyboard (88 keys)
2040 HALFSTEP#=2#^(1#/12#)  ' ratio of musical half-step
2050 NOTEFREQ#(0)=440#/16#  ' 4th A below middle C (A above middle C = 440 Hz)
2060 REM    fill in base octave
2070 FOR I=1 TO 11: NOTEFREQ#(I)=NOTEFREQ#(I-1)*HALFSTEP#: NEXT I
2080 REM    fill in rest of array
2090 FOR I=12 TO 87: NOTEFREQ#(I)=NOTEFREQ#(I-12)*2#: NEXT I
2100 REM
2110 REM  Build the note count array
2120 DIM NOTECOUNT(87)
2130 FOR I=0 TO 87: NOTECOUNT(I)=FIX(783360#/NOTEFREQ#(I)): NEXT I
2140 REM
4000 REM  Build the note translation table
4010 REM
4020 PRINT: PRINT "    Building translation tables....."
4030 DATA "CDEFGAB012345678#%"
4040 DATA 0,2,4,5,7,9,11,-9,3,15,27,39,51,63,75,87,+1,-1
4050 RESTORE 4000
4060 READ NOTENAMES$
4070 DIM NOTEINDEX(LEN(NOTENAMES$))
4080 FOR I=1 TO LEN(NOTENAMES$): READ NOTEINDEX(I): NEXT I
4090 REM
4100 REM  Build duration table
4110 DURNAMES$="SEQHW"
4120 DIM DURVALUE(LEN(DURNAMES$))
4130 DURVALUE(1)=1
4140 FOR I=2 TO LEN(DURNAMES$): DURVALUE(I)=DURVALUE(I-1)*2: NEXT I
4150 REM
5000 REM  Compile the music into a square-wave synthesizer record
5010 REM
5020 PRINT: PRINT "Compiling music....."
5030 SYNTHREC(0)=-1  '  Negative number indicates square-wave
5040 RESTORE 9000: READ TEMPO,VOLUME: TICKSPER16TH=900/TEMPO
5050 SYNTHPTR=1: BYTECOUNT!=0
5060 READ DURNOTE$: DURATION$=LEFT$(DURNOTE$,1):IF DURATION$="X"THEN GOTO 5160
5070 NOTE$=RIGHT$(DURNOTE$,LEN(DURNOTE$)-1)
5080 IF NOTE$<>"R" THEN GOTO 5100
5090 SYNTHREC(SYNTHPTR)=0: SYNTHREC(SYNTHPTR+1)=0: GOTO 5140
5100 INDEX=0
5110 FOR I=1 TO LEN(NOTE$)
5120 INDEX=INDEX+NOTEINDEX(INSTR(NOTENAMES$,MID$(NOTE$,I,1))): NEXT I
5130 SYNTHREC(SYNTHPTR)=NOTECOUNT(INDEX): SYNTHREC(SYNTHPTR+1)=VOLUME
5140 SYNTHREC(SYNTHPTR+2)=TICKSPER16TH#*DURVALUE(INSTR(DURNAMES$,DURATION$))
5150 SYNTHPTR=SYNTHPTR+3: BYTECOUNT!=BYTECOUNT!+6: GOTO 5060
5160 SYNTHRECLEN!=2+BYTECOUNT!
5170 REM
6000 REM  Set up sound Write parameter list
6010 REM
6020 PRINT: PRINT "    Setting up parameter list....."
6030 FOR I=0 TO 49\2: PARAMLIST(I)=0: NEXT I
6040 PARAMLIST(24\2)=-4  '  Sound reference number
6050 LPOKE!=FNCODE!(LPOKE)
6060 CALL LPOKE!(VARPTR(PARAMLIST(0))+32, VARPTR(SYNTHREC(0)))
6070 CALL LPOKE!(VARPTR(PARAMLIST(0))+36, SYNTHRECLEN!)
6080 REM
7000 REM  Generate sound
7010 REM
7020 IOWRITEASYNC!=FNCODE!(IOWRITEASYNC)
7030 CALL IOWRITEASYNC!(VARPTR(PARAMLIST(0)))
7040 WHILE PARAMLIST(16\2)<>0: PRINT "Computing while generating sound.": WEND
7050 PRINT: PRINT "Press a key to do it again..."
7060 WHILE INKEY$="": WEND: GOTO 7000
7070 REM
8000 REM  Initialize the machine language subroutines
8010 REM
8020 REM   HEX (Intel format) data for machine-language subroutines
8030 DATA "1C000000000C002000300044005400624E560D00206E0008301020 6E000C3080CA"
8040 DATA "1C001C004E5E4E754E560000206E000A30AE00084E5E4E754E56000020 6E00088E"
8050 DATA "1C0038002010206E000C20804E5E4E754E560000206E000C20AE00084E5E4E7550"
8060 DATA "1C0054004E560000206E0008A0034E5E4E754E560000206E0008A4034E5E4E75F4"
8070 DATA "000000000000"
8080 REM
8090 DIM CODEARRAY(200)
8100 DEF FNCODE!(OFFSET)=VARPTR(CODEARRAY(0))+OFFSET
8110 RESTORE 8030  '  Restore to machine-language HEX data statements
8120 MLLINE=8030  '  First DATA statement line number
8130 READ ML$  '  Read next line of HEX data
8140 MLCHK=0  '  Initialize checksum
8150 FOR I=1 TO LEN(ML$)-1 STEP 2  '  Scan by bytes (pairs of hex digits)
8160 MLCHK=(MLCHK+VAL("&H"+MID$(ML$,I,2))) MOD &H100'  Compute checksum
8170 NEXT I
8180 IF MLCHK<>0 THEN CLS: PRINT CHR$(7);"Error in ML line ";MLLINE: STOP
8190 MLL=VAL("&H"+MID$(ML$,3,2)+MID$(ML$,1,2))  '  Get byte count of ML string
8200 MLS=VAL("&H"+MID$(ML$,7,2)+MID$(ML$,5,2))  '  Get start addr of ML string
8210 IF MLL=0 THEN GOTO 8280  '  Zero byte count ends ML data
8220 FOR I=0 TO MLL-1
8230 POKE FNCODE!(MLS+I),VAL("&H"+MID$(ML$,9+I*2,2))  '  Put ML data in array
8240 NEXT I
8250 MLLINE=MLLINE+10  '  Keep track of DATA line number, in case of error
8260 GOTO 8130
8270 REM  Set up CALL address pointers - offsets are at beginning of array
8280 WPEEK=CODEARRAY(0): WPEEK!=0  '  Two-byte peek
8290 WPOKE=CODEARRAY(1): WPOKE!=0  '  Two-byte poke
8300 LPEEK=CODEARRAY(2): LPEEK!=0  '  Four-byte peek
8310 LPOKE=CODEARRAY(3): LPOKE!=0  '  Four-byte poke
8320 IOWRITE=CODEARRAY(4): IOWRITE!=0  '  Synchronous Write ROM call
8330 IOWRITEASYNC=CODEARRAY(5): IOWRITEASYNC!=0  ' Asynchronous Write ROM call
8340 RETURN
8350 REM
9000 REM  This is the music to be played
9010 REM
9020 REM    First data item is tempo, in standard metronome units
9030 REM        (quarter-note beats per minute).
9040 REM    Second data item is volume, in range 0 through 255
9050 REM    Subsequent data items are duration, note codes:
9060 REM        Duration is single letter
9070 REM            (S[ixteenth], E[igth], Q[uarter], H[alf], or W[hole]).
9080 REM        Note is note letter (C, D, E, F, G, A, or B),
9090 REM            followed by octave digit
9100 REM                (octave 4 starts with Middle C),
9110 REM            optionally followed by # for sharp or % for flat.
9120 REM        Note may be single letter R to indicate rest.
9130 REM    Final data item is single letter X.
9140 REM
9150 DATA 100,32
9160 DATA HR,ER,SD5,SR,SD5,SR,SD5,SR
9170 DATA HG5,HD6
9180 DATA EC6,SB5,SA5,HG6,QD6
9190 DATA EC6,SB5,SA5,HG6,QD6
9200 DATA EC6,SB5,SC6,HA5,QR
9210 DATA X
9220 END
```

```
1000 REM  Demonstration of Macintosh free-form sound generation
1010 REM    Dennis F. Brothers - CompuServe 70065,172 - MCI Mail DBROTHERS
1020 REM    Copyright (c) 1984 - Brothers Associates, Wayland, MA
1030 CLS
1040 PRINT: PRINT "Macintosh Free-Form Sound Synthesizer Demonstration"
1050 PRINT: PRINT "Initializing - Please wait....."
1060 REM
1070 DEFINT A-Z  '  Default to integers for speed and space
1080 DIM PARAMLIST(49\2)  '  Standard ROM Write parameter list
1090 DIM SYNTHREC(2+4096\2)  '  Synthesizer record - mode word,
1100 REM                        rate longword, 4096 bytes of synthesizer data
1110 GOSUB 8000  '  Initialize the machine-language subroutines
1120 REM
5000 REM  Set up synthesizer record for explosion (decaying white-noise)
5010 REM
5020 PRINT: PRINT "    Building synthesizer record....."
5030 SYNTHREC(0)=0  '  Mode 0 is free-form synthesis
5040 LPOKE!=FNCODE!(LPOKE)
5050 CALL LPOKE!(VARPTR(SYNTHREC(1)), 65536!/8!)  '  8 X 45 = 720 uS per byte
5060 FOR I=0 TO 4095: ENVELOPE=(4095-I)\16
5070 POKE VARPTR(SYNTHREC(3))+I, FIX(ENVELOPE*RND): NEXT I
5080 SYNTHRECLEN!=6+4096
5090 REM
6000 REM  -->  MERGE LINES 6000 THROUGH 8350 FROM LISTING 1 HERE  <--
6010 REM
```

A+ is also publishing these programs on CompuServe so that you can download them directly into your computer without needing to retype them. To access the programs, log on to CompuServe and type GO PCS51. ✚



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Launching the Macintosh Library

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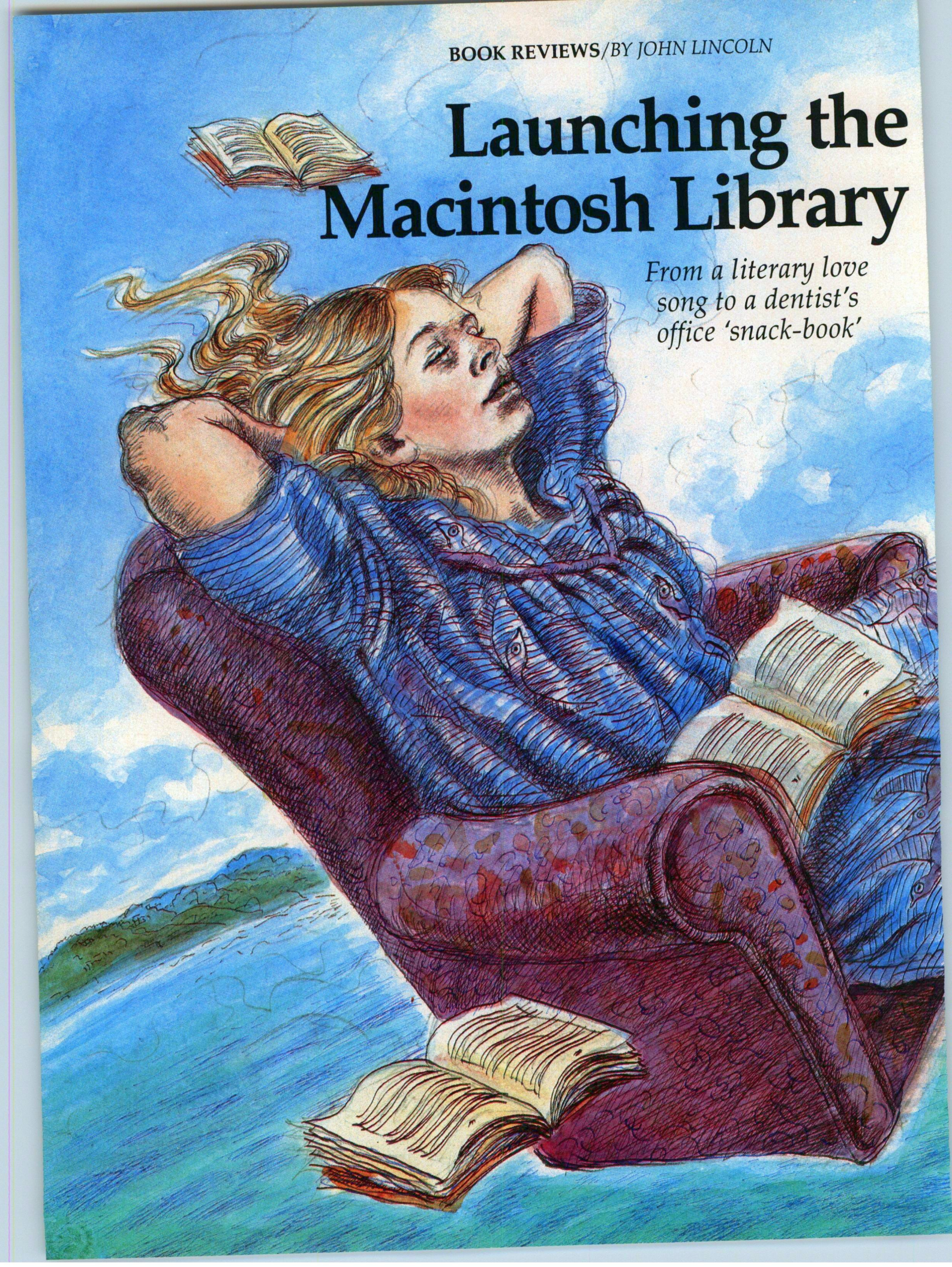

The Apple Macintosh Book by Cary Lu is an elegantly crafted, insider's view of the new 32-bit microcomputer from Apple.

The book is the first to be published by Microsoft Press. Its parent company is better known for its software, which is said to be running on some five million personal computers worldwide. Indeed, Microsoft has been an extension of Apple Computer's Mac software team from the beginning, three years ago, and will have at least eight Mac programs on the market by year's end.

This hand-in-glove relationship between Microsoft and Apple shows in the detail, the insight, and the caring that have gone into this book. The author, who is currently microcomputer editor for *High Technology* magazine, spent the year preceding the Mac's debut working with the product's designers. The result is a highly readable, informed narrative to satisfy curious novices and inquisitive computer veterans alike.

Divided into four main sections, *The Apple Macintosh Book* offers a pathway into the Mac for micro users at all levels. For those who want to learn a single program—MacWrite, for example—a single chapter may suffice. As users become more comfortable with the Mac, they may want to learn more and can set their own pace.

If learning to use and understand the Macintosh were a computer-science course, this would be the textbook. The author describes current and future software applications, as well as his own Mac innovations, such as tracing designs with the mouse and a drafting machine. The book includes information on such obscure, yet useful, topics as transferring files from other computers to the Mac, reproducing high-quality images of Mac screens, the Mac for the handicapped, the Mac in your vehicle, the Mac and video, and telecommunications with the Mac.

The generous insertion of crisp Mac screen graphics into the text perfectly supports the tutorial nature of the text. The design of the book reflects its lengthy development time, carefully spent, and the result is clarity for readers.

It's one of the two best Mac books on the market.

Macintosh! Complete

Macintosh! Complete is the other.

Author Doug Clapp, known for his chatty, entertaining, and highly personal column in *InfoWorld* magazine,

CARLOS AGUIRRE

was the only writer, other than Cary Lu, to have access to the Macintosh design team during early stages of product development. Technical material aside, the two authors have managed to present us with two entirely different books.

Clapp writes about computers with the intention that readers become excited about them—and he is especially earnest about the Macintosh. "You may never understand the electronic details of Macintosh (and you'll never *need* to understand them)," he writes, "but be assured that Macintosh embodies a magical hardware design."

This book earns the adjective "user-friendly." It manages to address the complexities of microcomputer management in such a way that readers/users remain engaged, even through the tough stuff (which Clapp does not avoid). Summarizing the four major concepts behind the Mac, Clapp writes: "Documents are displayed in Windows, manipulated by Tools, and found on Desktops. What could be simpler than that?"

The book's illustrations consist of well-reproduced screen dumps, plus black-and-white photographs, many of which support the wry, humorous tone that pervades Clapp's writing.

Unabashedly devoted to the Mac and all it stands for, Clapp runs the risk of coming across as a tout. Unemotional journalism this is not. Is it, then (one must ask), entirely objective? It's more like a love song to a computer, which makes it especially appealing if you, too, love the Mac.

Macintosh! Complete is not a textbook; it's more of a technological romance. It is illuminating and entertaining, thoughtful and thought-provoking, thorough and thoroughly fun.

Introducing the Apple Macintosh

Introducing the Apple Macintosh, which hit the bookstands on the day the Mac went public, bears the scars of a forceps delivery.

The book's most conspicuous problem is an abundance of typographical errors, which leaves the impression that the book was hurried into print.

Clapp writes about computers with the intention that readers become excited about them.

In addition, in numerous places in the text, the reader expects an illustration but has to do without. For example, "There are three conventional control mechanisms available for any Macintosh application programmer to apply: *buttons, check boxes,* and *dials*. All three are graphic inventions that respond to a pointer moved into place by the mouse." So what do they look like? If the authors know, they do not show us.

Another example: "If you transgress the limits of prudent behavior when dealing with Mac, you will be made aware of your improprieties by the appearance of *alert boxes*. Alert boxes are similar in appearance to dialog boxes." Sadly, neither box is illustrated so that we can understand the point. (And how about that convoluted syntax?)

The Mac screen illustrations that do appear in *Introducing the Apple Macintosh* have the annoying habit of sometimes appearing a page or more away from the text they refer to.

The engineering achievement of the Macintosh is diluted, overlooked, and lost. "You may be wondering how all commercial programs for Mac," the authors write, "can possibly employ the same graphic metaphors and relate to you in a fashion consistent with the Macintosh character. The answer is carried within two ROM chips (firmware) inside Mac." End of explanation. End of chapter.

Introducing the Apple Macintosh suffers from too little information, too little proofreading, and too little production time.

This computer deserves a better book.

Presenting the Macintosh

Presenting the Macintosh is either a magazine article masquerading as a book or a book designed to read like a magazine article.

It's inexpensive, brief, and easy to read. It's a snack-book, which is OK. It lacks pretensions. The illustrations consist of out-of-focus photos of Mac screen images, which is consistent with the book as a whole. But, although this book belongs in any barber's or dentist's magazine rack, where it might surprise and inform a casual browser, discerning computer users should look elsewhere for information.

Is it endearing? Is it breezy? You decide: "The Macintosh may be the greatest word processor of all time—and then, maybe not. We like it. There are some things we don't like about it, though . . ."

Or this: "As you know, file folders are like clothes hangers. You never have just the right amount. There are either too many or too few. The too *few* problem is solved on the Macintosh. The too *many* problem you'll have to solve yourself."

The authors sprinkle this dim-bulb style of writing throughout material that should be familiar to anyone who has read a Mac magazine article in recent months. As information, it satisfies like burgers and shakes—a lot of people like burgers and shakes, and I'm not knocking them. Trouble with junk food, though, is that it's short on nutrition.

Same with this book. ✚

THE BOOKS

The Apple Macintosh Book
By Cary Lu
Microsoft Press
Bellevue, WA; 1984
385 pages, soft cover
$18.95

Macintosh! Complete
By Doug Clapp
Softalk Books
North Hollywood, CA; 1984
330 pages, soft cover
$19.95

Introducing the Apple Macintosh
By Edward S. Connolly
and Philip Lieberman
Howard W. Sams & Co., Inc.
Indianapolis, IN; 1984
188 pages, soft cover
$12.95

Presenting the Macintosh
By Merl K. Miller
and Mary A. Myers
Dilithium Press
Beaverton, OR; 1984
119 pages, soft cover
$5.95

GRAPHICS/*BY W. CHARLES DOHERTY*

High-Fidelity Graphics

The George Lithograph Screens reproduction process for the Macintosh

Computer graphics has taken a giant leap forward with the introduction of Apple's new Macintosh. Even those of us who could never draw a straight line can create our own masterpieces, thanks to innovative programs such as MacPaint. The graphics abilities of the Macintosh also have paved the way for a new generation of word-processing systems that make a snap of such things as changing type style and size.

As good as the Macintosh is when it comes to graphics, problems do arise when it's time to get the work out of the computer and onto paper. This activity becomes especially important when the printed material must be as close as possible to what is on the screen. The quality of the hard copy a dot-matrix printer produces is often satisfactory, but you may need a higher degree of resolution and detail for some tasks. A call to the George Lithograph Company in San Francisco, California, might then be in order.

Camera-Ready Artwork

The graphics division at George Lithograph has developed a system called the Screens process, which reproduces files from the Macintosh with a degree of resolution not possible with standard printers and without the distortion inherent in photographs of screen displays.

This new system reads images from a disk and transfers them electronically to either a laser printer or a high-resolution Autologic APS-5 typesetter, depending on the degree of fidelity you require. The laser method produces 300 dots/inch resolution, and the APS-5 typesetter is capable of 700 dots/inch. Both systems produce publication-quality output.

George Lithograph developed the Screens process in a joint effort with Apple as part of the Macintosh project. The Macintosh's high-resolution graphics capabilities render many previous methods of reproduction obsolete, but Screens makes it possible to typeset and print these graphics in a normal manner. In fact, George Lithograph, using the Screens process, produced the illustrations you see in the MacPaint and MacWrite manuals and most of the screen shots used in the *A+* Macintosh section (including the "Computer Bugs" illustration above).

Several options are available with Screens. If you want to reproduce a MacPaint file, Screens will print the entire file—not just one screen. Even if your picture does not fit on the computer's screen, the process can capture it on paper. None of the borders or headers that appear on the computer show up on the final print, however.

Another option is Snapshot Files, which reproduces an image exactly as it appears on the Macintosh's screen, with all borders and headers intact. This format is ideal for someone who is producing an instructional course or writing documentation for a piece of software, since it shows everything that is visible at a particular time. Before the arrival of the Screens process, it was impossible to reproduce this type of display without photographing the screen, which produced less-than-perfect quality.

To see how the system worked, we used a Macintosh to design a poster and sent a copy of the finished disk to George Lithograph. We also printed a copy of the poster on the Imagewriter printer to compare to the Screens version.

George Lithograph processed both a laser file and a high-resolution file from the disk, and the results were impressive. They printed both files on a much higher grade of paper than is typically used with the Imagewriter, resulting in a much whiter background than usual. The high-resolution file was produced on professional, photo-typesetter paper.

The Screens prints showed a greater degree of contrast between dark and white than was visible on the Imagewriter's output. Black areas were pitch-black rather than the dark gray of the Imagewriter. The edges of these areas were sharper and better defined.

Shaded sections had much better detailing on the prints from George Lithograph. Each individual dot was clearly discernible; print from the

ADELE ALDRIDGE

ATTENTION

Macintosh Aficionados

A+ would appreciate receiving any tips, hints, shortcuts, or suggestions that you have for using the Macintosh computer. We would like to publish these pearls in our MacTips feature in our Macintosh section. You'll receive credit in the magazine, and we'll pay $50 for each MacTip that we use. Send your tips to:

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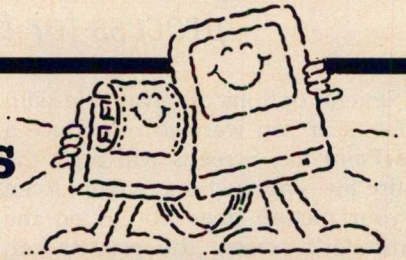

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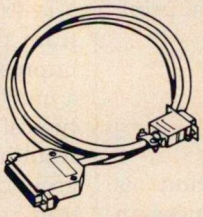

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Imagewriter had dots that were often blurred.

Differences between the high-resolution and laser versions from George Lithograph are more subtle. Although both are of excellent quality, the added detail of the high-resolution print—combined with the higher grade of paper—makes it a better choice for use as camera-ready artwork for publication.

The size of a finished print can be anywhere from 1 × ¾ inch to 9 × 7½ inches for high-resolution prints or from 2⅜ × 1⅞ inches to 9⅝ × 7⅝ inches for laser prints. In addition, special effects are attainable by stretching or squashing the print either vertically or horizontally.

Price varies acording to the type of print you want and the number of disks used. A $20 charge for each disk encourages you to put as many files as possible on the same disk.

A high-resolution file carries a $22 charge for any of the nine available sizes. If a laser file is suitable for your needs, you will save a considerable amount. Each laser file is only $6, and you can choose from four different sizes.

George Lithograph can process your work and have it ready to ship in just one day, if you need only a limited number of prints. For anyone working under a tight deadline, such service can be a real lifesaver.

Ideal for Producing Software

The Screens process is perfect for anyone who is designing products for use with the Macintosh—especially software manufacturers and publishers. It reproduces an exact image of any Macintosh display and has the potential to make documentation easier to produce than ever before.

Screens is also appealing to those who are using a Macintosh for graphic design or illustration. The reasonable pricing and fast service from George Lithograph make the system practical for many different applications, from architecture to industrial design. Home users of Macintosh will find the Screens service useful for designing such things as party invitations, birth announcements, and Christmas cards.

For more information on the Screens process, or to place an order, contact Erica Austin or Len Schafer at George Lithograph Company, 650 Second Street, San Francisco, CA 94107. Or call them at (415) 397-2400. +

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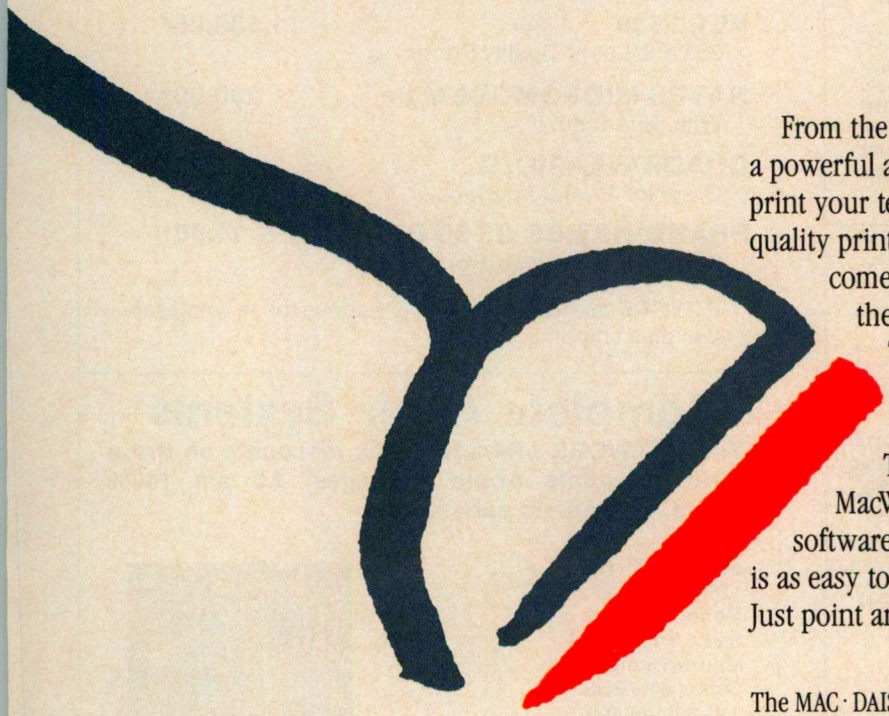

From the team who wrote MacWrite™ comes a powerful application program that allows you to print your text with any popular daisywheel, letter quality printer. The new Mac Daisywheel Connection comes with the interface cable you'll need, the software program and a quick start-up guide. The application program is straightforward and maintains the visual fidelity of your file even when you mix text and graphics. The Mac Daisywheel Connection supports MacWrite and Multiplan™ and other Macintosh software products. The Mac Daisywheel Connection is as easy to use as your Macintosh mouse. Just point and print!

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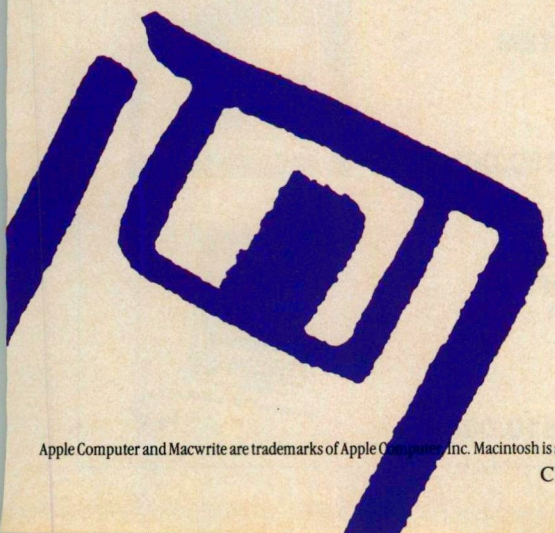

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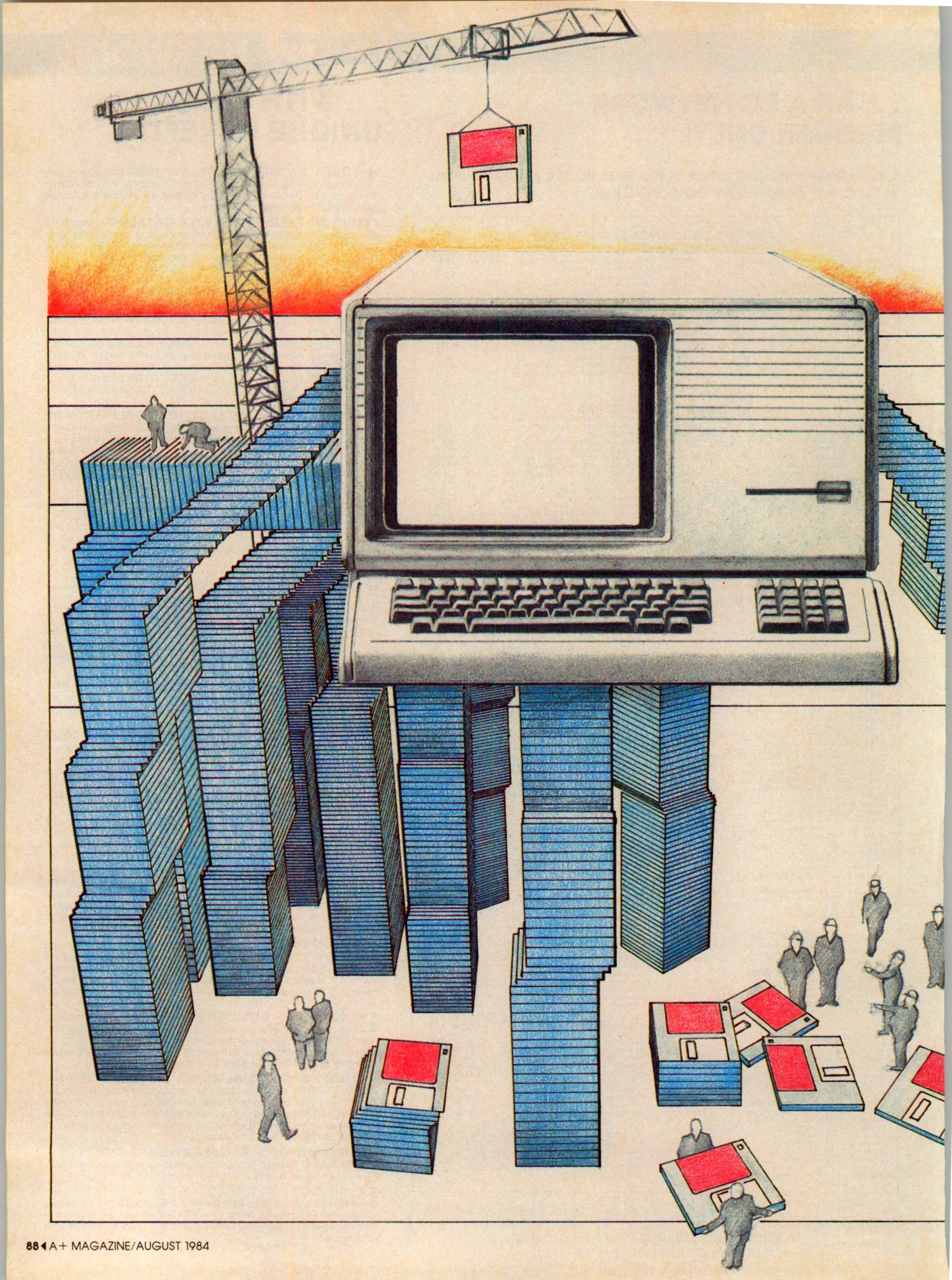
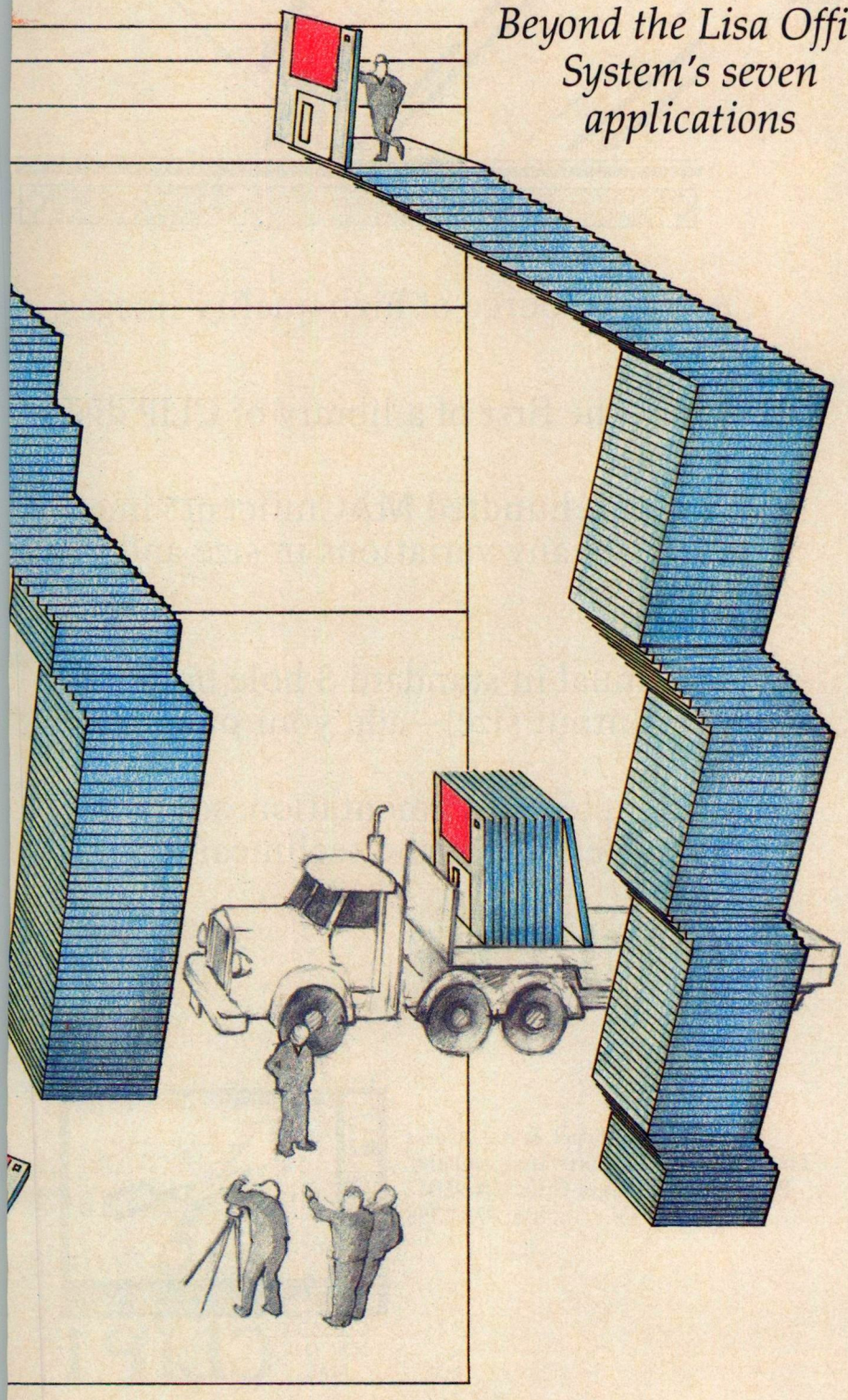


Support for the Lisa

Beyond the Lisa Office System's seven applications



A full year after the shipment of the first Lisas, application programs from outside developers are finally available. BPI Systems, Inc., and Business and Professional Software, Inc., beat all competition by shipping last fall; a handful of companies started shipping in the spring; and another two dozen have promised products this summer. Bruce Blumberg of the Lisa marketing group at Apple estimates that 200 companies are working on future products.

The original Lisa marketing strategy put little emphasis on third-party software, which probably explains why Apple has been slow to ship its languages and utilities. "We had some trouble getting the tools into the developers' hands," admits third-party-products manager Dan Cochran, "but now people have the tools, and they're getting pretty excited about what they can do." Most of the programs discussed in this article were developed with prerelease versions of QuickPort and Toolkit/32 (see "Behind the Office System," page 91), both of which were scheduled to be ready for the Lisa "spring release," which was expected in June.

The new application software represents a good cross section of the business, professional, and accounting programs that have made personal computers so popular, although most of the offerings are at the high end of the scale in both price and power. Some of the programs were written from scratch to fully exploit the Lisa desktop environment, but most of them are upgraded versions of already-successful microcomputer packages. Quite a few companies are offering programs for one of the two versions of the UNIX operating system now available for the Lisa.

Office Automation

The most thoroughly integrated program announced so far is Desktop

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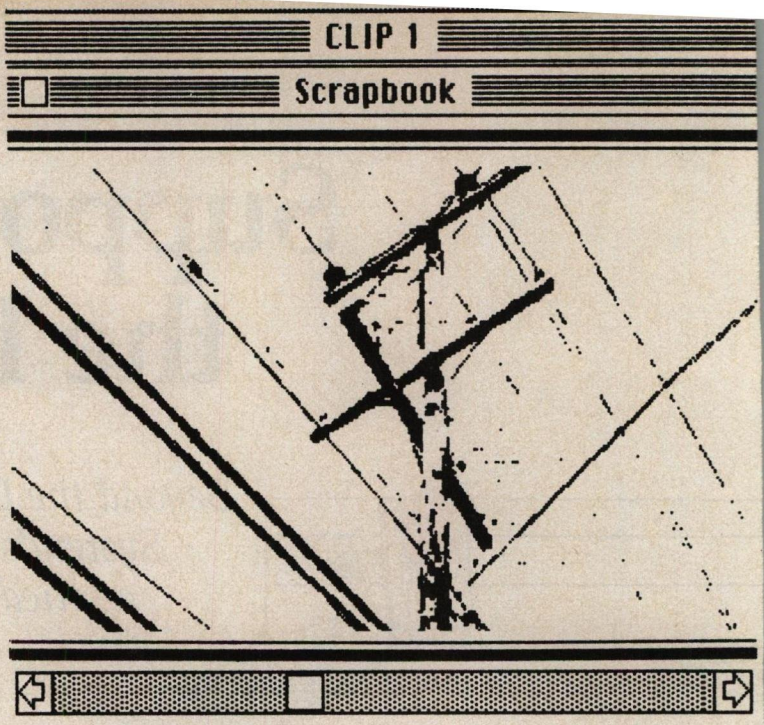

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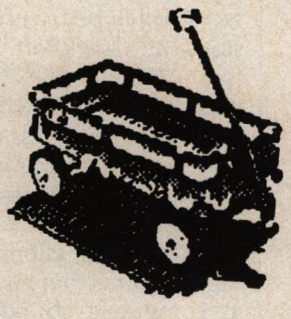

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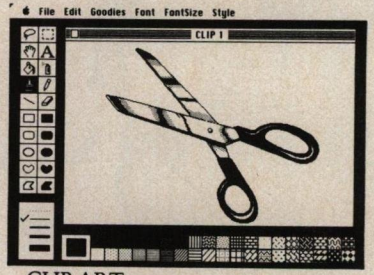

CLIP ART FOR THE MAC **CLIP 1**

CIRCLE 143 ON READER SERVICE CARD

Calendar from Videx, Inc., scheduled for release this summer. Priced at $295, the program takes full advantage of windows, much like the Apple-supplied office tools do. You can scroll and size the graphic-display windows, you have several different display fonts available, and you can print both the calendar proper and a scratchpad. You can set the alarm to remind you of appointments, and it will go off regardless of which application is running at the time. Although paper calendars are almost as functional and much more portable, Desktop Calendar is an elegant addition to the Lisa desktop and an excellent use of the system's graphics.

Art Department, from Business and Professional Software, is a library of graphic images for use with LisaDraw. This is a high-tech version of the clip art that is common in newspaper advertisements and company newsletters. For $195, BPS provides 300 generic drawings, sorted into familiar categories: office work, transportation, health, and media, for example. Unlike the traditional paper line drawings, however, these images are easy to tailor to the application at hand. The pictures are intended for integration into LisaDraw documents, where you can resize, reshape, and incorporate them with text as needed. Art Department is simply an application of the existing LisaDraw software and has been available since last fall.

Accounting and Finance

BPI Systems, which has enjoyed steady sales of its Apple II and III accounting programs, has already released Lisa versions of four of its products: General Accounting, Accounts Receivable, Accounts Payable, and Payroll. The programs retail for $595 each. Although the Lisa adaptations basically work like the earlier versions, they do run faster and allow use of the mouse for editing and menu selection.

Execucom Systems promises delivery of IFPS/Personal in August. This package integrates the iconic Lisa environment with Execucom's nonprocedural modeling language. The Lisa software will be compatible with mainframe versions of IFPS (Interactive Financial Planning System), commonly used for economic analysis. The Execucom system is more elaborate and probably more expensive than most microcomputer products (the Lisa price has not yet been set). The software is not available on the less-powerful Apple II or III.

Professional Tax Planner and Estate Tax Planner, from Aardvark/McGraw-Hill, were both to be available for the Lisa by early summer. Both of these programs for tax professionals offer limited use of the mouse for menu access, as well as cut-and-paste compatibility with LisaWrite, but their operation is otherwise identical to that of the Apple II and III versions. Professional Tax Planner ($350) compares alternative tax strategies, with projections for up to five successive years. The program calculates alternative minimum tax, ten-year averaging, investment-interest expense limitations, and contribution limitations to 20%, 30%, and 50% charities. Estate Tax Planner ($750) provides a wider range of comparisons plus built-in calculations for gross assets, estate-tax liability using year-by-year unified credit and tax schedules, present value of death taxes, and surviving-spouse assets. The publishers offer an optional maintenance agreement, which can be cost-effective for software that requires annual updates.

Also for financial professionals, CRTplus from Aurora Systems is designed to help institutions provide customer support and education, by providing on-the-spot financial analysis and explanation. Aurora vice-president Dan Stein maintains that using microcomputers for customer interaction "delivers more product information and enhances the relationship-building aspects of providing products and services to customers." CRTplus calculates and prints early-withdrawal analyses, IRA-account analyses, loan amortization, installment-loan options, and investment-tax strategies. The program is scheduled to ship this summer, but the price has not been announced. It will be available for both the Lisa and the Macintosh, and on the Lisa it will run simultaneously with communications programs.

Compu-Law is now shipping a QuickPort version of its Client Management System 3.1, a package tailored to the accounting needs of a small- to medium-sized law office. Priced at $2495, the software stores client and case information, produces billing statements and financial analyses, and handles specialized legal accounting tasks such as trust, retainer, and unbilled-time accounting.

Similarly, Charles Mann Associates has adapted its medical-office software for the Lisa. LisaMediCard ($350) offers record management, private patient billing, and universal AMA claim forms.

Data Management

Omnis is a versatile database program from Organizational Software Corporation. The program is powerful and allows up to 12 related files to be open at one time. Omnis works on the Lisa, the Macintosh, and the Apple II series. Although the program is new to the United States, it was developed in England and has been used extensively overseas by large corporations. Omnis is one of the best software packages on the market this year, and with a retail price of $295 it is also one of the best values.

dBASE II, one of the best-selling database-management systems for microcomputers, will be available for the Lisa from Ashton-Tate by the end of this year. The Lisa implementation will be compatible with Apple's LisaWrite, allowing the merging of data and text files.

Wadsworth Professional Software promised release later this year of Statpro, which takes advantage of the graphic Lisa environment for data analysis. Aimed at professional data analysts, Statpro is a package of statistics, graphics, and data-management programs. The price of the package for the Apple II and III is $1995.

Sorcim Corporation, whose SuperCalc 3 and SuperWriter programs run on 50 different kinds of microcomputers, also promises an integrated package for the Lisa, combining spreadsheet, database, and graphic functions, to be available in late 1984. Sorcim has announced neither a name nor a price for the product.

UNIX Software

Two companies are offering Lisa versions of the UNIX operating system, which is increasingly popular in timesharing environments. Both Lisa versions support multiple users, who log on through attached terminals or microcomputers. The terminals can be attached through the Lisa's two built-in serial ports or through a multiport expansion card.

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Behind the Office System

Most of us are content to use our personal computers as word processors and accountants, making our own lives easier by using the programs that somebody else has written. Fortunately for us, not everyone shares this attitude. Some people believe that computers are for programming.

The Lisa Office System, as it's usually sold, makes no provisions for programmers. Apple supplies a unique Lisa operating system, known as the Desktop Manager, and a set of application programs, known as tools. In order to write and run your own programs, you need a different package, a more traditional operating system, and a programming language. For software developers, Apple supplies The WorkShop, with a choice of Pascal, COBOL, FORTRAN, or BASIC, and it promised the C language for the spring.

Until a few months ago, the only readily available option for a programmer working on the Lisa was to write stand-alone programs that took over the machine, independent of the iconic desktop environment. The QuickDraw package included in the Pascal system provided utilities for using the mouse and the bit-mapped graphics display, but the carefully developed user interface that was the Lisa's main selling point was not easily accessible.

This limitation has been removed with the release of two important development tools, QuickPort and Toolkit/32.

QuickPort now comes with every language product that Apple sells for the Lisa. It is what Dan Cochran describes as a "low-overhead way to port existing programs to the Lisa environment." With QuickPort and the original code, you can transform existing programs written in any of the supported languages into Lisa application tools, complete with stationery pads and document icons.

First, you adjust the source code to the Lisa-specific version of whatever programming language you are using. This step can be tedious, but it is usually not very difficult. When the program runs successfully as a stand-alone application within the development environment, you recompile it with QuickPort. The result is a Lisa tool and stationery pad completely compatible with the Desktop Manager. The package includes an icon editor, so you can add your own graphics to the tool, stationery pad, and document icons.

The program runs in a Lisa window, just like the Apple-supplied office tools. The Edit and File/Print menus are both available, so you can cut, copy, edit, and select text with the standard Lisa mouse and keyboard commands.

The QuickPort windows support two panes, one for data entry and the other for graphics. The data pane recognizes "readln" and "writeln" interactions, and the graphics pane recognizes mouse events. Note, however, that you have to rewrite any existing graphics routines for QuickDraw before they can run in the graphics window.

QuickPort was designed only to expedite the transporting of existing programs. Programs developed with QuickPort offer basic mouse and menu functions, but most of them do not take full advantage of the desktop environment. If you are interested in fully exploiting the Lisa interface, you will probably want to start building your programs from scratch, in which case you'll want to use the Toolkit.

QuickPort itself, and all of the integrated applications such as Videx's Desktop Calendar and Sorcim's spreadsheets, were written with the Toolkit. What it offers is a thorough set of programmers' utilities that streamline the process of building an application around the Lisa user interface. To make the best use of the package, you should take the time to become familiar with Clascal, Apple's object-oriented programming language, which comes with the Pascal package.

The best of the third-party Lisa software will undoubtedly spring from the Toolkit. Unfortunately, since the Toolkit has not been generally available until recently, most of the programs now available are simply slightly faster versions of applications that already run on less powerful machines.

eration, comes in three modules: the XENIX Operating System ($795), the XENIX Software Development Environment ($595), and the XENIX Text Processing System ($495). The entire package is available for $1495. The Santa Cruz Operation also offers a spreadsheet, a word processor, a relational database, a form generator, a symbolic debugger, and two versions of COBOL that run under XENIX. At least seven other publishers have announced application programs for XENIX.

UniPress Software, Inc., is also offering a $1495 package, which comprises four modules: a single-user version of the UniPlus+ operating system ($495), a multiuser upgrade ($495), the C Development Environment ($495), and a text processor ($495). Like The Santa Cruz Operation, UniPress has announced a spreadsheet, a word processor, and several development tools. The available languages are SVS FORTRAN for $600, SVS Pascal for $600, SVS BASIC-Plus for $400, and Ada and COBOL together for $1250.

Office Packages

Q-Office, an entire line of integrated office tools from Quadraton Systems, is available for either XENIX or UniPlus+. The complete Q-Office package sells for $1860 and consists of nine individual programs. Q-One ($595), the word processor, promises compatibility with almost any printer and includes a records processor that lets you merge documents with data files. Q-Date ($155) is a desktop calendar, Q-Math ($115) is a calculator, Q-Note ($115) is a personal filing system, and Q-Call ($115) is an electronic phone directory. Q-Mail ($155) provides an electronic-mail service between users on either the same system or the same network. Q-Form ($395) and Q-Menu ($395) are both system-level tools. Q-Form is for forms generation and file management, and Q-Menu expedites the design of a customized interface for the Q-Office system.

Open Systems is selling its Software Fitness Program accounting series for the Lisa under XENIX. Exploiting the multiuser capabilities of XENIX, Open Systems has made its Lisa software compatible with the Macintosh. "With the Lisa as host computer, the Macintosh can run all Macintosh software and the Software Fitness Program applications concurrently in a Macintosh window,"

claims vice-president Ann Winblad. The product line includes Accounts Payable, Accounts Receivable with Billing and Sales Analysis, General Ledger, Payroll, Inventory, Sales Order Entry, Purchase Order Processing, Job Cost, and an integrated report writer and data formatter called Team Manager, each priced at $595.

Another multiuser accounting package, Real World Business Software ($695) from RealWorld Corporation, includes Accounts Receivable, Order Entry with Inventory Control, Sales Analysis, Accounts Payable, General Ledger, and Payroll.

Horizon Software Systems, Inc., is offering a Lisa adaptation of its word processor for $395, its spreadsheet for $195, and its combined word processor and spreadsheet for $595.

Condor Computer Corporation has adapted its two database-management systems for the XENIX operating system. Condor 1 sells for $650, Condor 3 for $295. SMC Software Systems is also offering a database manager and report generator, called IDOL, for $595. SMC also provides a multiuser, modular accounting package known collectively as Thoroughbred Business Software.

Two tax-preparation packages are available from Accountants Microsystems, Inc. Tax Machine, for professional accounts, costs $1495, and the stripped-down Personal Tax Machine costs $295.

Two companies offer applications programs for use with the UniPlus+ version of UNIX. The UNIFY relational-database-management system from Unify Corporation sells for $1495. TOM Software offers a complete line of office-management and accounting packages, including programs tailored for distributorships, restaurant- and food-service companies, not-for-profit corporations, and property management. The Office Manager sells the products as 70 modules, each priced individually. The company plans to convert all of its modules to run on the Lisa.

The easy availability of UNIX gives the Lisa access to a well-established collection of software developed for larger systems. Quite a few UNIX software houses are distributing Lisa versions of their products on the 3½-inch microdiskettes now standard for the Lisa, and some microcomputer software companies are entering the UNIX market with Lisa products. +

List of Companies

Aardvark/McGraw-Hill
1020 North Broadway
Milwaukee, WI 53202
(414) 289-9988

Accountants Microsystems, Inc.
1404 140th Place NE
Bellevue, WA 98007
(206) 643-2050

Ashton-Tate
10150 West Jefferson Blvd.
Culver City, CA 90230
(213) 204-5570

Aurora Systems, Inc.
2423 American Lane
Madison, WI 53704
(608) 249-5875

BPI Systems, Inc.
3423 Guadalupe
Austin, TX 78705
(512) 454-2801

Business and Professional Software, Inc.
143 Binney Street
Cambridge, MA 02142
(617) 491-3377

Charles Mann Associates
55722 Sante Fe Trail
Yucca Valley, CA 92284
(714) 365-9718

Compu-Law
3520 Wesley Street
Culver City, CA 90230
(213) 558-3360

Condor Computer Corporation
P.O. Box 8318
Ann Arbor, MI 48104
(313) 769-3988

Execucom Systems Corporation
3410 Far West Blvd.
Austin, TX 78731
(512) 346-4980

Horizon Software Systems, Inc.
#4 China Basin Building
185 Berry Street, Suite 4821
San Francisco, CA 94107
(415) 543-1199

Open Systems, Inc.
430 Oak Grove, Suite 409
Minneapolis, MN 55403
(612) 870-3515

Organizational Software Corporation
2655 Campus Drive, Suite 150
San Mateo, CA 94403
(415) 571-0222

Quadratron Systems, Inc.
15760 Ventura Blvd., Suite 1032
Encino, CA 91436
(818) 789-8588

RealWorld Corporation
Dover Road
Chichester, NH 03263
(603) 798-5700

Sorcim Corporation
2310 Lundy Avenue
San Jose, CA 95131
(408) 942-1727

SMC Software Systems
1011 Route 22
P.O. Box 6800
Bridgewater, NJ 08807
(201) 685-9000

TOM Software, Inc.
(The Office Manager)
P.O. Box 66596
Seattle, WA 98116
(206) 246-7022

The Santa Cruz Operation, Inc.
500 Chestnut
Box 1900
Santa Cruz, CA 95061
(408) 425-7222

Unify Corporation
9570 SE Barbur Blvd.
Portland, OR 97219
(503) 245-6585

UniPress Software, Inc.
1164 Raritan Avenue
Highland Park, NJ 08904
(201) 985-3773

Videx, Inc.
1105 NE Circle Blvd.
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PFS-File™	120	32K	32	1	1600	no	no	no	menu	no	1,2,3,4	no
PFS-Report™	120	-0-	-0-	-0-	-0-	no	Report only	no	menu	no	1,2,3,4	no
OMNIS 2	**195**	**unlimited***	**120**	**1**	**9600**	**yes**	**yes**	**no**	**menu**	**yes**	**1,2,3,4,5,6**	**yes**
Database Manager II	295	unlimited*	40	1	2400	no	yes	no	menu	yes	1,2	no
DB Master™ App.	350	250K	100	1	1020	no	yes	no	menu	yes	3,4	no
IBM	595	1000K	250	1	3000	no	yes	no	menu	no	1,2	no
OMNIS 3	**295**	**unlimited**	**1440**	**12**	**25000**	**yes**	**yes**	**yes**	**menu**	**yes**	**1,2,3,4,5,6**	**yes**
dBase™II	695	65K	32	2	1000	no	yes	yes	comm	yes	1,2,3,4	no
CONDOR™3	650	64K	127	6	1024	no	yes	no	comm	no	1,2,3,4	no
R:BASE™ 4000	495	unlimited	400	40	1530	no	yes	yes	menu	yes	1,2	no

*Limited only by disk capacity Chart compiled from published information

1—IBM PC
2—IBM XT
3—Apple IIE
4—Apple III
5—Macintosh
6—Lisa

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PIPELINE

New Products

BY CANDACE DE SANTIS AND JONATHAN NEHER

Software and hardware companies are putting their designers to work creating new versions of existing products to take advantage of the Macintosh's unique abilities. This chart is an ongoing *A+* feature to keep you abreast of what's new for the Macintosh. For further information on any of these products, please circle the corresponding number on the Reader Service Card in this issue.

	DEVELOPER	PRODUCT NAME	AVAILABLE	CARD#
COMMUNICATIONS	Communications Research Group	Blast	Sept. 84	451
	Dilithium Software	PC to Mac and Back	Nov. 84	452
	Hayes Microcomputer Products	Smartcom	Oct. 84	453
	Microcom	ERA 2	Now	454
	Winterhalter	DataTalker	Now	455
EDUCATION	ATI	How to Use Your Macintosh	Now	456
	Logo Computer Systems	MacLogo	Nov. 84	457
	Mosbysystems	TeStar	Sept. 84	458
	Roger Wagner Publishing	Typing Tutor	Now	459
	Simon & Schuster	Typing Tutor III	Now	460
ENTERTAINMENT	Blue Chip Software	Millionaire	Now	461
		Tycoon	Now	462
	Infocom	Deadline	Now	463
		Infidel	Now	464
		Starcross	Now	465
		Witness	Now	466
		Zork I, II, & III	Now	467
	Oasis Systems	Sundog	1985	468
HARDWARE	Assimilation Process	Mac Daisywheel Connection	Now	469
	Davong Systems	Disk Drive	Now	470
		MacTape	Sept. 84	471
		Networking	Sept. 84	472
		Tape/Disk Drive	Sept. 84	473
	Street Electronics	Echo GP	Now	474
	Thermodyne Corp.	Mac Carrying Case	Now	475
PRODUCTIVITY	Aurora Systems	CRTplus	Now	476
	Chang Laboratories	Ledger	Now	477
		Payables	Now	478
	Computer Identics	Mac BarCode	Now	479
	Continental Software	The Home Accountant	Now	480
	DB Master Associates	DB MacMaster	Now	481
	Harvard Associates	MacManager	Now	482
	Kriya Systems	HouseCat	Nov 84	483
	Magnum Software	McPic!	Now	484
	Simple Software	MacCheckbook	Sept. 84	485
		Magic Calculator	Nov. 84	486
	Software Publishing Corp.	PFS:File	Now	487
		PFS:Graph	1985	488
		PFS:Report	Now	489
		PFS:Write	1985	490
UTILITY	Ashton-Tate	dBase II	Now	491
	Creative Solutions	Graphic Terminal Emulator	Now	492
		MacForth	Now	493
	Digital Research	Dr. Logo	Oct. 84	494
	Volition Systems	Modula-2	Sept. 84	495
	Mesa Graphics	Tekalike	Now	496

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ELECTRONIC U

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Electronic University, from TeleLearning Systems, offers an innovative home-education system that combines the time-honored idea of the correspondence course with your Apple computer. Students enroll in courses, receive lessons, and send in homework over the phone lines via a modem.

A Potpourri of Classes

Electronic University is a cross between a small college and a community night school. With an initial choice of 177 courses—and a whopping 500 being readied for 1985—chances are you will find a course that appeals to your interests. TeleLearning expects to offer about 700 courses, drawing on instructors from colleges, technical schools, primary schools, and trade associations.

Many of the courses teach the general material you would expect in the freshman or sophomore year—topics such as Western civilization, American history, general biology, and beginning foreign languages.

Others focus on helping students enter the business world. The American College Testing/Proficiency Examinations Program offers extensive business-preparatory courses in accounting, marketing, operations management, finance, and human-resources management. The American Management Association's Extension Institute gives courses on planning cash flow, planning company budgets, and management communication.

TeleLearning also maintains a series of courses to help you prepare for postgraduate tests such as the Graduate Record Examination (GRE); the Law School Admission Test (LSAT); the Medical College Admission Test (MCAT); and the Certified Public Accountant Examination (CPA).

All Work and No Play?

Lest you think college makes you bookish, the Electronic University offers numerous courses for personal enrichment—Speed Reading, Memory Training Techniques, Chinese Regional Cooking, Basic Concepts in Astrology, and Crap Shooting for the Innocent.

If you have children, some of the courses dealing with parenting may prove helpful. You can take Early Learning—Brighter Children, Reading Aloud to Your Child, How to Discuss Sex with Your Child, and Children's Writing Begins at Home. You can also obtain a certified math, science, or reading tutor for children in grades 3 through 6.

TeleLearning also offers some computer courses to help you get the most out of your hardware and software. You can take Computer Literacy for the Apple IIe, BASIC Programming, Spreadsheets, Data Base Management, and several others.

Judging from the biographies in the course catalog, TeleLearning has drawn on some knowledgeable instructors. They seem to be competent professionals, and many of them have already taught at small colleges. For example, Hal Fedick, who teaches the Crap Shooting for Innocents course, is an engineer for an aerospace firm and teaches advanced statistics at De Anza College in Cupertino, California. Dr. James Pinto, who teaches Understanding Economic News, is an Associate Professor at Northern Arizona University, in Flagstaff, Arizona.

Registration

You can register for a course by calling TeleLearning's toll-free number and paying by credit card or by filling out a mail form and sending a check. A course consists of an introduction followed by a series of lessons. You are assigned an "electronic memory mailbox," which stores your lessons on TeleLearning's central computer. Instructors also have electronic mailboxes, and you use electronic mail to communicate with them.

Attending Class

Once you are registered, TeleLearning immediately transmits the course introduction to you via electronic mail. The other course materials—usually textbooks and a special disk to hold necessary graphics for the lessons—are sent through regular mail.

You need not worry about oversleeping and missing that important class. You can access TeleLearning's computer 24 hours a day through Tymnet, Telenet, or Uninet. If your computer cannot access one network, it automatically tries another.

TeleLearning has created sophisticated software for accessing its system. The software transfers the modem's "intelligence" to your Apple's RAM (random-access-memory) and places all the necessary communications protocols on disk. Thus, you get the capabilities of a smart modem without hardware modifications, and you only

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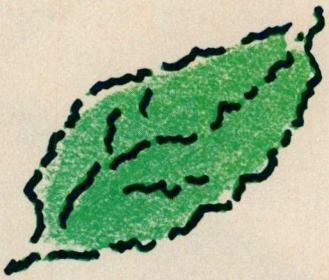

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need to press one button to connect with the TeleLearning computer. All the user codes, terminal identifiers, and log-on sequences are automatically fed in from the disk.

Although TeleLearning cannot guarantee foolproof communication, it has tried to design a crashproof system. The central computer and your Apple run under an error-detection and correction protocol. All data being transmitted is verified continuously, and, if necessary, retransmitted.

If, for any reason, something out of the ordinary should occur, students can use TeleLearning's toll-free hot line, which answers customer questions.

The Personal Touch

The heart of TeleLearning's appeal is a personal, interactive approach to learning. Unlike large universities that pack hundreds of students into a lecture hall, the Electronic University features one-on-one communication between student and teacher. Students can receive special attention and get answers to their specific questions.

Electronic University courses follow the same general format as "live" classes do. You download the lesson, which contains a lecture, reading assignments, and perhaps a suggestion for an outside activity. From time to time, you also receive a "progress evaluation."

In return, you send off the homework and tests for grading and respond to the instructor's questions. You can also ask questions, which are automatically passed along to the instructor. Generally, these electronic talks involve a 48-hour time lag.

In addition, using electronic mail, you can set up a "live" appointment with the instructor. In this mode, the program calls up a graphics routine to display the instructor's photograph on the monitor. Your conversation appears below the photograph. As with the regular electronic mail, you can save the text to disk.

TeleLearning suggests that instructors keep regular office hours, and it plans to monitor instructors to make sure they actually communicate with their students.

Telecommunications and Education

Electronic University is the brainchild of Ronald F. Gordon, TeleLearning's chairman and former chief executive officer of Atari. Gordon, who is credited with inventing the hand-held computer and pocket language translator, believes that personal computers will soon become as cheap as calculators. He started TeleLearning with the aim of developing and marketing an inexpensive, interactive, electronic home-study system that would take advantage of this perceived computer boom.

Gordon hopes to market the system to universities and corporations. These institutions would write their own courses and seminars but would pay for system packages and time on the TeleLearning network.

TeleLearning recently received a big boost from the Reagan administration. Vice-President George Bush sent a telegram praising the company's efforts to provide low-cost education using the technology of the personal computer.

Moreover, when the first student enrolled for college credit in an English composition course at Thomas A. Edison College, in Trenton, New Jersey, Assistant Secretary of Education Dr. Donald Senese was on hand to praise TeleLearning's efforts.

The heart of TeleLearning's appeal is a personal, interactive approach to learning.

Campus Life

The Electronic University does have a few drawbacks, and just about all of them have to do with social matters. Unless you happen to live close to fellow students, you cannot drop in on the "TGIF" happy hour at the local pub and commiserate with them about the impending midterm exam. You can't mingle with members of the opposite sex at a friend's monster party either. Forget about playing crazy midnight practical jokes on your friends or engaging in food fights.

On a more practical level, some classes—such as most of the labs—really need a "live" instructor. I'm not so sure every home that has an Apple also has a complete biology or chemistry lab. In addition, 48 hours is a long time to wait for an answer to a question when you are in the process of dissecting something.

TeleLearning recognizes the need for discussion among students and intends to add to its electronic mail so that students can converse with each other.

The TV Degree

TeleLearning is exploring other ways of providing many people with quality education. In association with the Corporation for Public Broadcasting, which has received funding from Annenberg Publishing, TeleLearning is trying to set up a system combining TV classes, college credit, and computer communications.

The PBS network would broadcast courses prepared by universities. The students, who would receive college credit, would use their home computers to turn in their assignments. So far, the University of Wisconsin, University of Nebraska, and California's San Diego State University have expressed interest in participating.

TeleLearning is also exploring the possibility of offering high-school degrees in the same way, but this service depends on Gordon's prediction of cheap and plentiful computers coming true.

Computer U

As TeleLearning expands and improves the Electronic University, more and more features will fill those gray areas that detract from computer learning. Students will form clubs, hold conversations on a party line, and trade notes. Someone might create a fraternity for all Macintosh brothers or a sorority for all Lisa sisters. Perhaps someone will organize a homecoming parade, with graphics floats.

The Electronic University uses the power of the computer to provide fast, flexible, and private education. With a multitude of courses to choose from, chances are you will find some to fit your interests. TeleLearning offers a practical application for your computer investment. +

▸ WHAT YOU'LL NEED

TeleLearning charges $79.95 for a starter set, which is basically the software you need to communicate with the central computer. The Knowledge Module, which contains a sophisticated 300-bps (bits per second) auto-dial modem and the software, costs $229.95. The Knowledge Module and a course called Computer Literacy and the Apple IIe cost $279.95. The cost of each course varies, but just about all of them are between $35 and $200.

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GRAPHICS/BY ROBERTA SCHWARTZ

SHAPING UP

PART I OF A REVIEW OF FIVE SHAPE-UTILITY PROGRAMS

Before Leonardo da Vinci could paint a portrait or bestow an enigmatic grin upon the face of the Mona Lisa, he had to make the brushes and paint that he used.

Even today, when an abundance of artists' materials is as close as the local art supplier or the Yellow Pages, some artists consider the preparation of their own media an integral and exciting part of the creation of their art. These purists stretch canvases and grind pigments, not because they have no easier alternative but because, for them, there is no other way. Today, advanced technology has brought new paints, acrylics, and alkyds, but the traditional temperas and oils still have their place on the palette.

So it is with microcomputer artists. The pioneers who purchased the first Apple II computers explored the graphics capabilities and discovered, bit by bit, their enormous potential. One of the most exciting features was the built-in Shape Table function, which allowed you to define a high-resolution graphic image; identify it with an index number; and then rotate, scale, and draw it in any of the Apple's hi-res colors. Though the process was tedious and often frustrating, programmers and artists used their computers to create dazzling games, animation, and graphic screens.

As new media have come to painters, so new and more powerful tools have been developed for computer graphics. Vector shape animation is now considered too slow for state-of-the-art arcade games, but it is still a powerful yet simple starting point from which you can branch out into more advanced areas.

APPLESOFT SHAPES TABLES

To draw a shape, the Apple uses a series of vectors that tell it whether or not to plot a particular point and in which direction to move to find the next point. An arrow with an open or closed dot at one end represents each vector (see figure 1). A vector shape is composed of lines of the same length that point in any of four directions—up, down, left, or right. You place the vectors head to tail until they have outlined the shape. To define a square, for example, you plot a line up, plot a line left, plot a line down, and plot a line right. Then you "unwrap" the vectors so the computer can convert them to a string of bytes and store them in memory as part of a shape table (see figure 2).

A shape table can contain up to 255 shapes. Once you've stored the shape table in the Apple's memory, you use BASIC statements to draw the shapes anywhere on either of the two hi-res screens in the computer's memory, in any one of the Apple's six hi-res colors. You can enlarge (scale) and rotate the shapes and have the computer draw the same shape over and over.

Shape tables let you create charts that are more effective than the standard line graphs and pie and bar charts (see figure 3). With the Xdraw command, you can draw in the background color. If you draw a shape and then xdraw it at the same coordinates, the shape will appear and disappear. If you do this a few times, each time drawing and xdrawing the shape a little to the side of the previous shape, your shape will appear to be moving across the screen because you've just used an animation technique. Among the shapes you can use are letters—myriad styles of alphabets can be (and have been) designed. With alphabet shape tables, you can generate text on the hi-res screen.

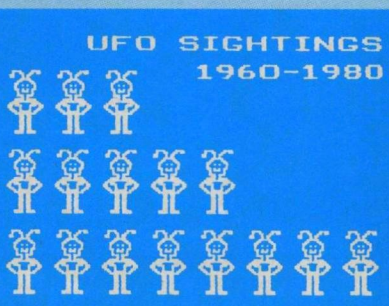

Figure 3: Using shapes, you can create charts that are more effective than the standard line graphs and pie and bar charts.

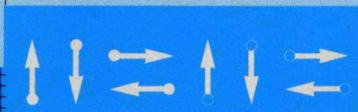

Figure 1: Each vector is visually represented by an arrow with an open or closed dot at the end of it.

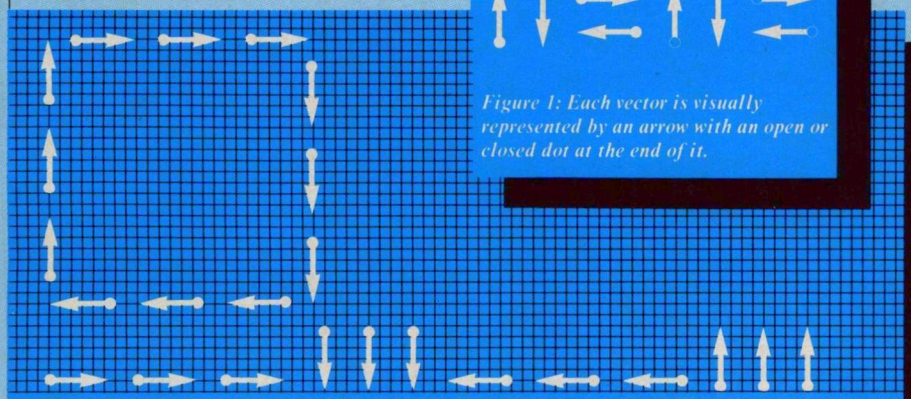

Figure 2: You place the vectors head to tail, until the shape is outlined. Then you "unwrap" the vectors.

CREATING SHAPE TABLES

The traditionalists among you, those of you who prefer to "grind your own pigments," will find a tutorial on creating Applesoft shape tables in the December 1983 and January 1984 issues of *A+* ("Making Hi-Res Characters" by Dorothy Stark).

Those of you who have neither the time nor the inclination to unwrap vec-

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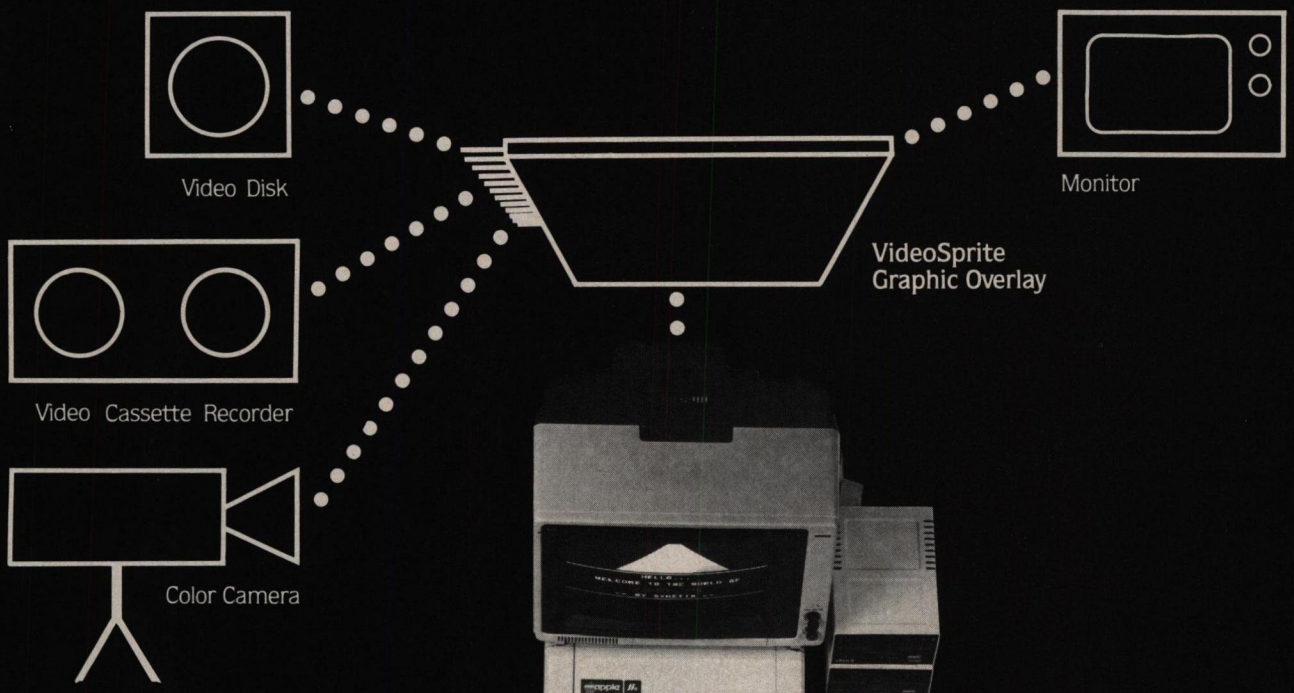

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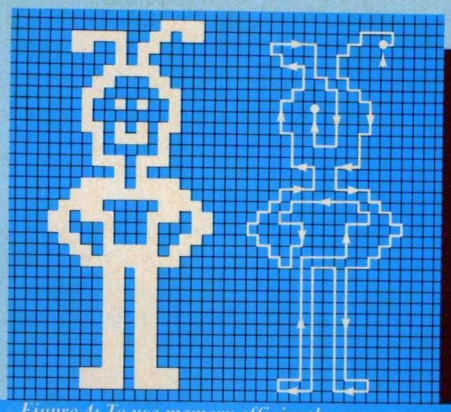

Figure 4: To use memory efficiently, you design the shape with as few "move without plot" vectors as possible.

HINTS FOR SUCCESS

Although the programs reviewed in this article greatly simplify the creation of shapes and shape tables, the quality of your creations depends on you, the artist. For professional results, follow these guidelines:

1. You should plan your shapes carefully. Start by designing your shape on grid paper and then plan the direction of the plots, using as few "plot without moves" as possible, to conserve memory (see figure 4).
2. The first vector you define in your shape, your first plot, determines the location of the shape when you specify the x, y coordinates. If you draw a square and you start it at the upper left corner, the shape's center will be at that corner. If you rotate it, the shape will pivot around that corner point instead of rotating around the center of the square. If you want a shape that rotates around its center, like a wheel on an axle, you must start your plotting in the center of the shape (see figure 6).
3. To draw a solid shape in color, without your having to specify Hcolor in your program, remember how the Apple computer uses color. If you plot a pixel in every column, your shape will be white, but if you plot a pixel in every other column, your shape will be in color. (Even columns give you blue and orange, and odd columns give you violet or green.)
4. Since most shapes contain vertical lines, you'll find that because of the idiosyncrasies of the Apple's color generation, if you choose a color other than white, part of the shape will be invisible. If you know you will be plotting in color, create your shapes with double vertical lines.
5. When you use Scale and Rot, you may get some distortion of the shape (see figure 5). Sometimes you'll be better off designing a separate shape in the desired size or rotation, rather than using the same shape with the Rot or Scale commands.
6. You use Xdraw for animation. The concept is to draw a shape, erase it, and then draw it again in another place. An animation sequence consists of the commands Draw, Update, Erase, Draw, Update, Erase, and so on. Notice that you update before you erase. The reason for this approach is that if you erase first and then update, you'll be left facing a blank screen for a moment. The commands work quickly enough that if you update and then erase, you will get the best results.
7. When you use the draw-and-erase technique for animation, you should use Xdraw, not Draw, even for the initial draw. If you don't use this method when rotating and scaling, the second Xdraw may not erase all of the previously drawn shape.
8. You can draw simple shapes and erase them quickly, but the drawing of complex shapes may be confusing to watch. In these cases, use both graphics pages. While you are viewing page 1, the computer draws the shape on page 2, and while you are viewing page 2, the computer is drawing the shape on page 1.
9. You can use more than one shape table in a BASIC program if you redefine the contents of memory locations 232 and 233 at the appropriate times.

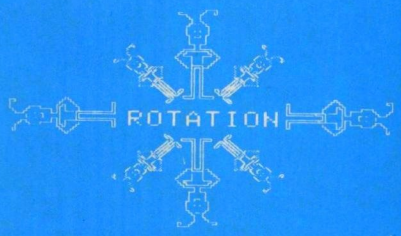

Figure 5: Rotating a shape may cause distortion.

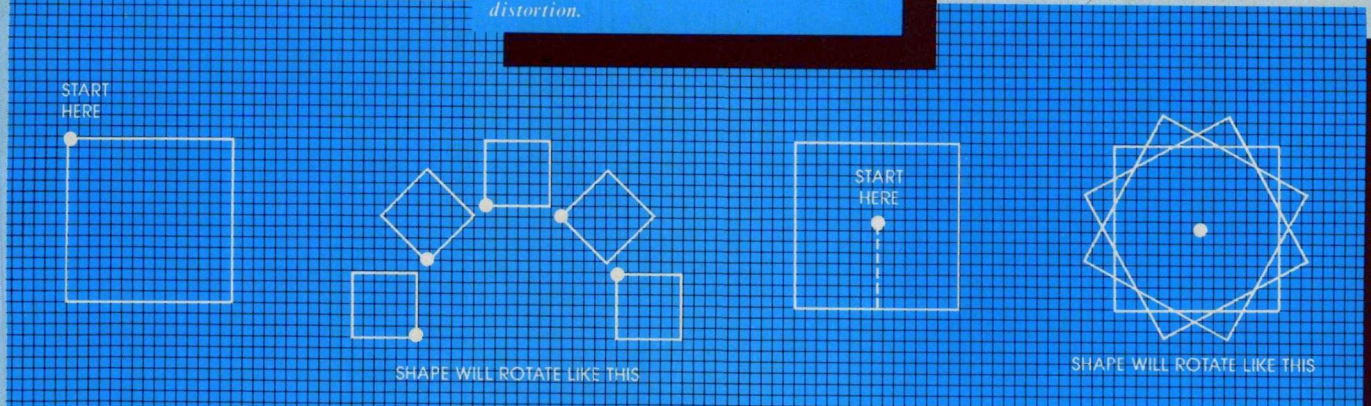

Figure 6: If you want a shape that will rotate like a wheel on an axle, you must start your plotting in the center of the shape.

tors, convert and code bytes, and build indexes, have an easier way—commercial software. The companies that have developed shape-utility software have given us the tools so that we can concentrate on the aesthetics.

SHAPE-UTILITY SOFTWARE

Many commercial graphics programs contain shape-maker utilities, as an enhancement to other graphics routines. This review will concentrate on software designed expressly for the creation of shapes and shape tables: Accu-Shapes by Accent Software, Apple Mechanic by Beagle Bros., Higher Graphics II by Synergistic Software, Pixit by Baudeville, and Shapes in Color by Hayden Software.

In reviewing these five programs, I may refer to some options that you are unfamiliar with. Here is a brief explanation of these options and their advantages:

1. A plotting grid helps you judge the position of your cursor and the proportions of your shape. If you have preplanned your shape on a paper grid, such as graph paper, the screen grid simplifies the translation.
2. The option to select a shape for reference makes creating sequences of shapes easier. If, for example, you're working on an animation sequence in which a man is walking across the screen, you can create a shape of the man in one position and save the shape. Then you can recall that shape on the screen, trace over it, and just change the position of the legs.
3. A shape-table editor allows you to create master shape libraries. You can use these libraries as a source of shapes for smaller tables when you need them.

ACCU-SHAPES

Accu-Shapes creates shapes differently than do most shape programs, in which you draw shapes on the hi-res screen, with the program recording the moves as you plot. With Accu-Shapes, you draw the shape on the low-resolution screen, and when you are satisfied with the shape, you trace the moves, and the program stores and compiles them. With Accu-Shapes, you can relax, experiment, and "play" with your shape and deal with efficient plotting later.

Documentation and the Demo

The 22-page manual, written as a tutorial, takes you step by step through the program's modes. It is thorough and easy to read and includes a brief explanation of how to use shape tables in your own programs.

When you are satisfied with the shape, you trace the moves, and the program stores and compiles them.

The demo is a tutorial that goes through the entire shape-creation sequence. You can load and study the demo shape table on the disk as well as a character set.

The Program

Accu-Shapes comprises four main modules. Pressing M, in any mode, shows all the options for that mode.

GR Mode

In this mode you design and trace your shape, which can be up to 40 × 40 pixels in size on the low-res screen. The program has no grid option, but the size of the low-res pixel makes it easy to see what you're doing.

You move the cursor around the screen with the A, W, D, and X (diamond pattern) keys. C centers the cursor, and / erases the screen. Pressing S

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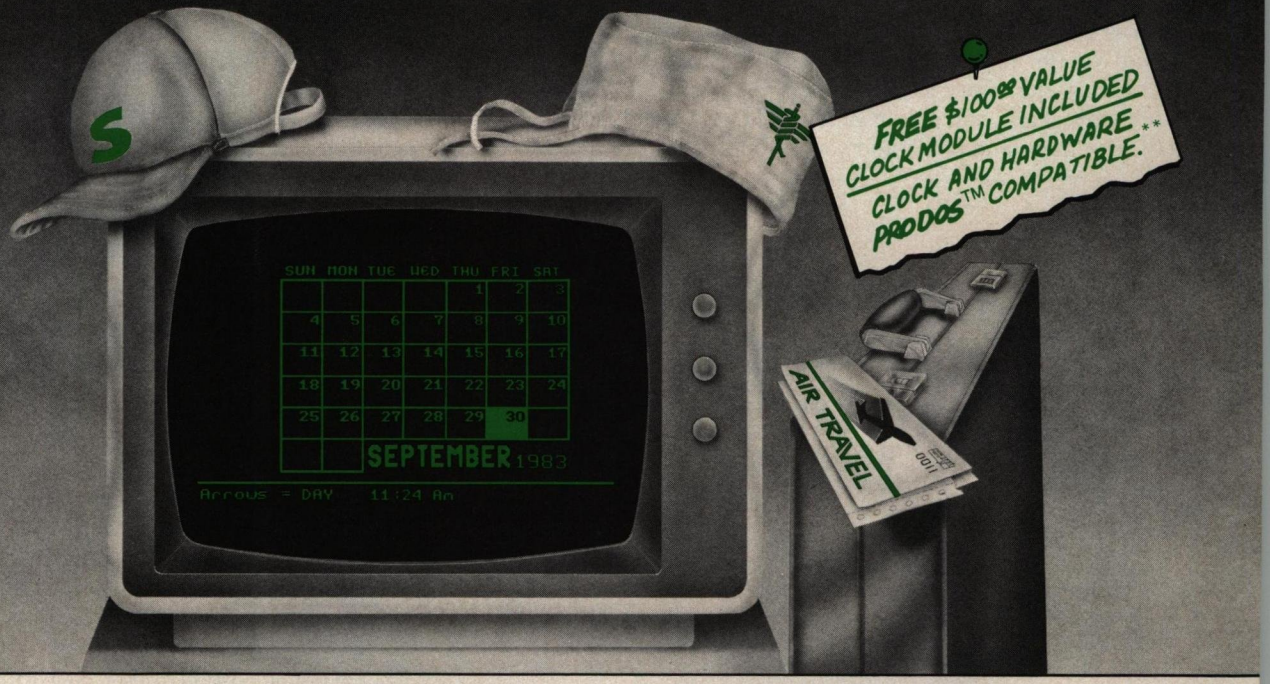

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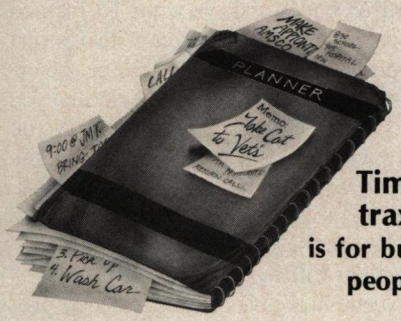

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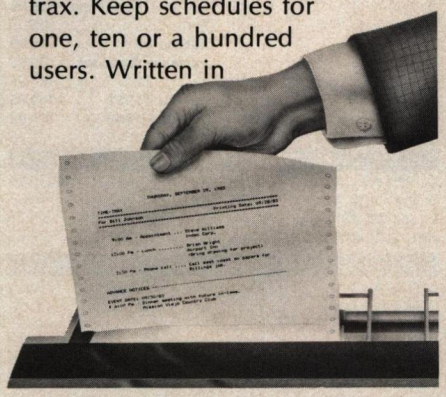

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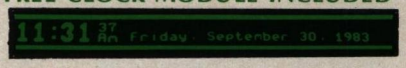

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for Scroll allows you to use the A, W, D, and X keys to move the entire shape. Other commands let you expand or compress your shape horizontally or vertically. At all times, the bottom lines of the screen indicate the current mode, status, and options.

Pressing the space bar cycles the program through the three plotting modes, Plot, Erase, and Retain. Plot turns on pixels, Erase turns off pixels, and Retain moves the cursor without affecting the pixels at all. When you draw the shape, you plot in yellow to indicate "move and plot," and you plot in blue to indicate "move and no plot." Once the shape's design is complete, you enter the Trace mode, which is where the program compiles your image into a standard Applesoft shape.

The Trace Mode

The Trace mode is a little tricky. At first, you'll probably need a few tries to effectively trace your shape, but you can stop tracing, restore the image, and try again until you get it right. As you trace your shape, the yellow pixels change to orange and the blue to green, which shows you how much of the shape remains to be compiled. You can choose a semiautomatic "continuous" trace or a "single step" trace. During the trace, you cannot make two consecutive moves up without plotting.

The HGR Mode

The HGR mode allows you to see the shape you've created on the hi-res screen and provides Draw, XDraw, Color, Rotate, and Scale options. It lets you move the shape around the screen. If you want to change your shape, pressing R returns you to the low-res screen with your shape intact, ready for editing. If you are satisfied with the way the shape looks, you can enter the Table-Options mode.

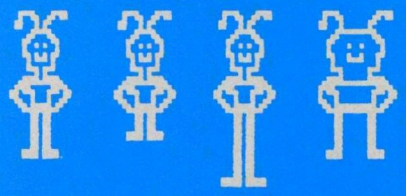

Figure 7: With Accu-Shapes, one-key commands let you make a shape taller, shorter, wider, or narrower.

The Table-Options Mode

In this mode you edit the shape table or combine shapes from different tables to form new ones. Shape tables can be as large as 1K, which gives you room for 20–40 large or 200–250 small (ASCII-character-set-size) shapes. You can page through your shape table, forward or backward, viewing 15 framed shapes at a time. You can also insert shapes, delete shapes, or change the order of the shapes in the table. When you are satisfied with your shape table, you can save it to disk. Then you can choose to load another shape table from disk, edit the table, or copy a shape from it to the low-res screen for editing.

Excellent Editing

Accu-Shapes is a well-designed program that offers outstanding capabilities that other programs do not have. The single-keystroke commands that allow you to expand, compress, and scroll your shapes enable you to alter shapes without having to redo them. They also enable you to use one shape as a source and change it to any number of new shapes, taller, shorter, wider, or narrower (see figure 7). The Retrieve command lets you take any shape, from any shape table and put it on the low-res screen for detailed alterations.

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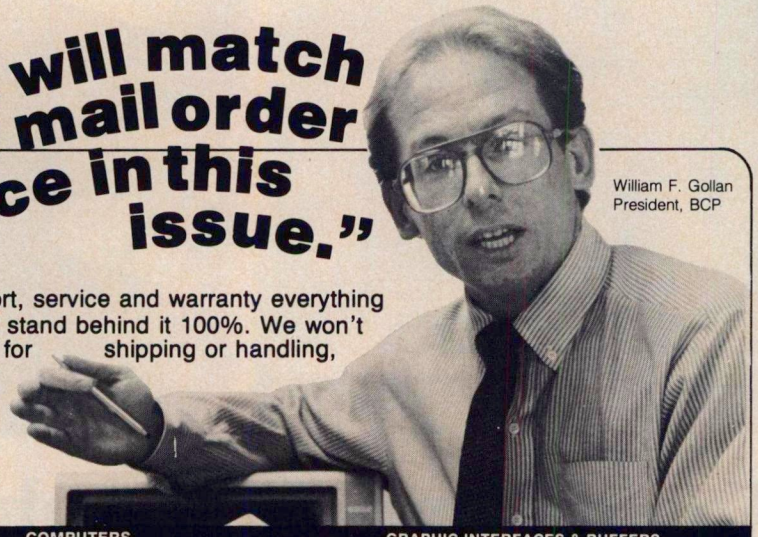

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shape program that offers some bonuses. The manual, for instance, contains a special subroutine section and an "Apple Tip Book" section. Add to this an 11 × 17-inch Peeks and Pokes wall chart as well as a Byte Zap utility, and you will understand why the Beagle Bros. have such a faithful following.

Documentation and the Demo

The 58-page manual contains concise but comprehensive directions on the use of the software and a section that explains shape tables and their use in BASIC programs. You also get a command-reference card to place on the keyboard.

The demo is humorous and effective: it will teach you a lot about using shapes and shape tables. The disk includes impressive sample fonts and shapes.

The Program

Apple Mechanic contains five utilities: Shape Editor, Character Editor, X Typer, Hi-writer, and Byte Zap.

The Shape Editor

The shape editor lets you create and store up to 12 shapes at a time, each one up to 48 × 63 pixels in size. As you plot, the shape number and vector number appear at the bottom of the screen. In this mode you can save a shape table, load a shape table into memory, catalog the disk, change disk drives, preplot, and imprint.

When you begin, you see two rectangles on the screen, one an enlarged grid that plots your shape at three times its actual size and the other a smaller grid that shows the actual size of your shape. If you load a shape table for editing (it must be a table that was created with Apple Mechanic), the 12 shapes appear on the screen. If the shapes are large, they may overlap. If no table is loaded, you will see 12 dots. Pressing the arrow keys displays one shape at a time.

After indicating that you want to edit a shape, you then use the arrow keys to scan the entire shape table. When you decide which shape you want to edit, you press the Return key and a grid appears on the screen. You move the cursor, using the arrow keys, A, and Z, to any position on the grid and press S to start.

In Apple Mechanic, editing a shape really means creating or replacing a shape. You cannot choose to edit a shape and have it appear on the grid for you to change. The space bar toggles between "move and plot" and "move without plotting." You use the X key to backspace and erase parts of the shape—you can erase as much as you need to. The program has no restrictions on the number of moves you can make without plotting.

Imprint allows you to choose a shape from the table and have it 'shadow plotted' on the grid, anywhere you wish.

The Preplot and Imprint functions are the highlights of this program. If you choose Preplot, you "sketch" your shape with dots on the grid. When you are satisfied with the sketch, you go into the Plot mode and trace over the sketch to create your shape. Imprint allows you to choose a shape from the table and have it "shadow plotted" on the grid, anywhere you wish, for you to trace or copy. You'll appreciate this function most when you want to create shapes with slight variations for a sequence.

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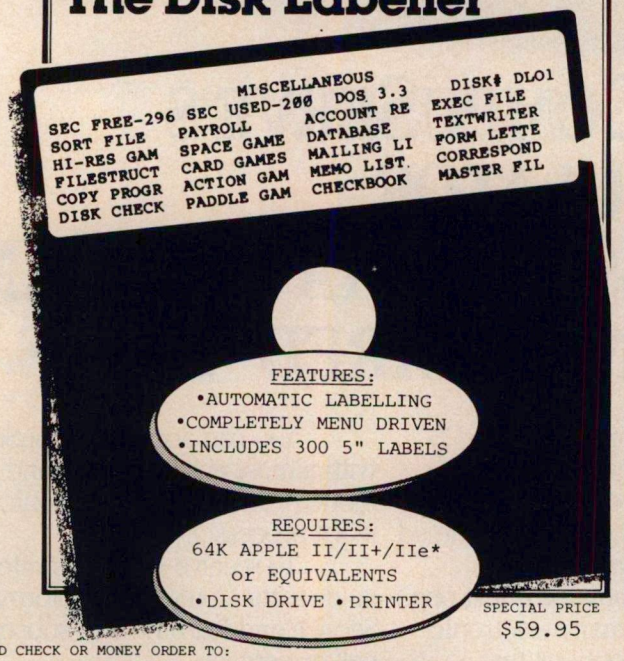

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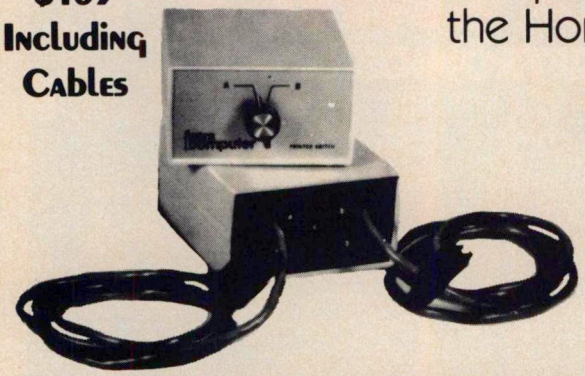

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The Shape Analyzer

This utility lets you load a shape table and analyze its individual shapes, choosing rotation, scale, color of shape, and color of background. Shapes can be drawn, xdrawn, and moved. In addition, you can print out text describing each shape's vectors. The shape analyzer accepts shape tables created with any shape program.

The Font Editor

Fonts you create with this package are shape fonts and are proportionally spaced. The character editor, or font editor, is similar to a shape editor, and it allows up to 95 shapes in fonts that can be 3–16 dots high. Word spacing and distance between lines of type is adjustable. The plotting grid magnifies your shape ten times and you see your shape at its actual size in the corner. The font editor's editing commands are the same as those in the shape editor. X-Typer lets you type fonts onto any hires screen; Hi-Writer allows you to use the shape fonts in your own programs; and Byte-Zap is a disk utility for editing bytes on any DOS 3.3 diskette.

Mixed Bag

Apple Mechanic is not as complete a shape-creation package as the others reviewed in this article, but it does offer simplicity. It lacks shape-table editing functions, and the 12-shape limit can be discouraging, but the documentation shows you how to use more than one shape table in a program. The font editor, the demo fonts, and the font utilities are excellent.

Look for Part II of this review in next month's A+. ✚

▸ PRODUCT INFORMATION

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By Jason Marks
Accent Software
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Palo Alto, CA 94306
(415) 856-6505
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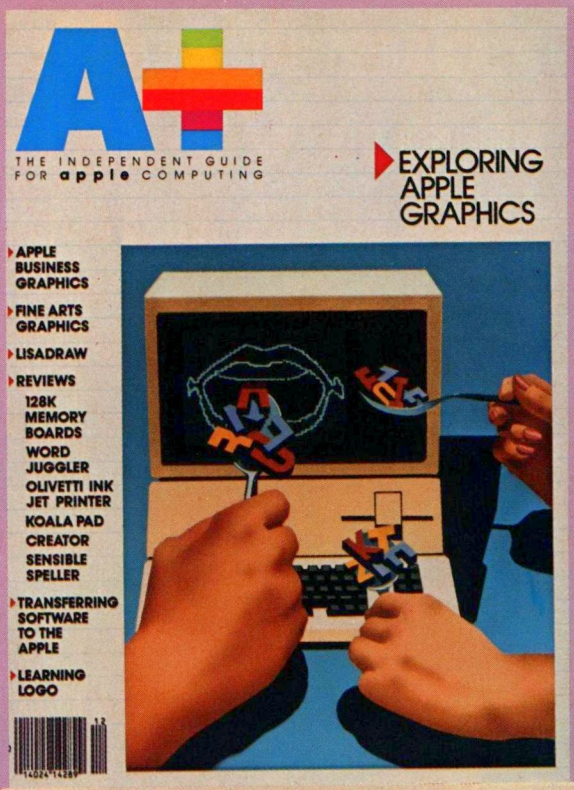

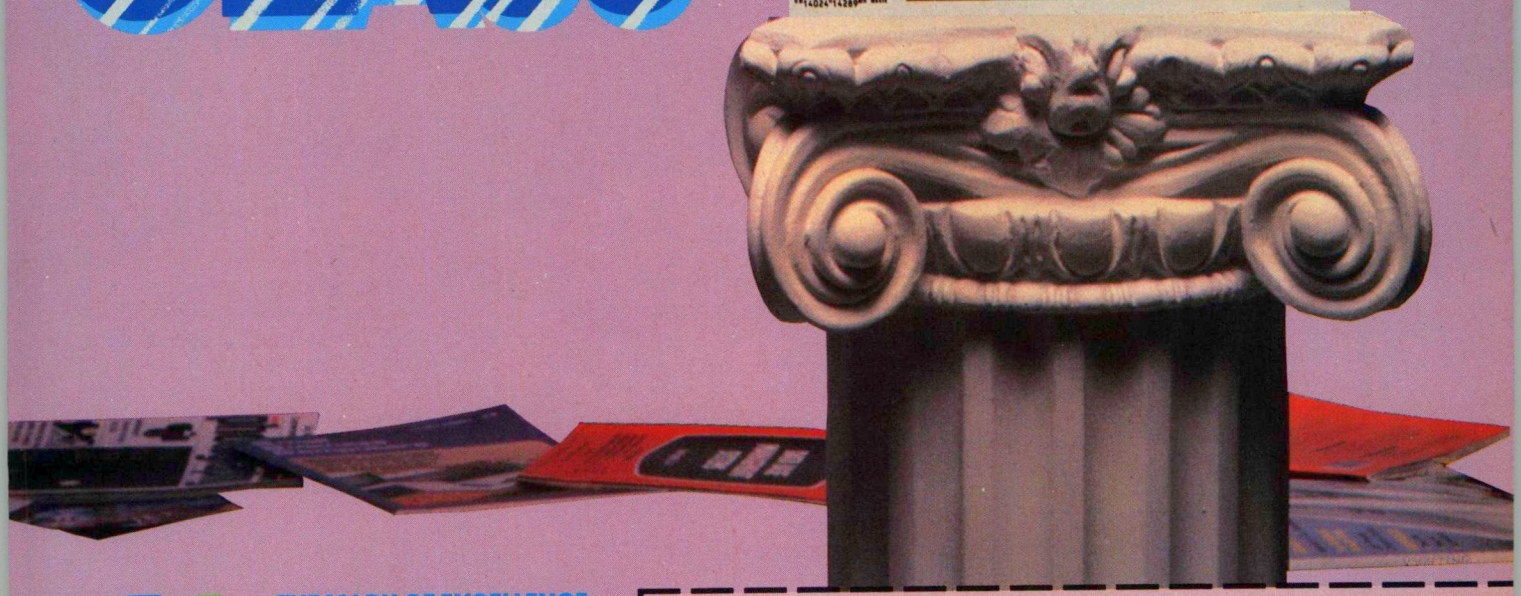

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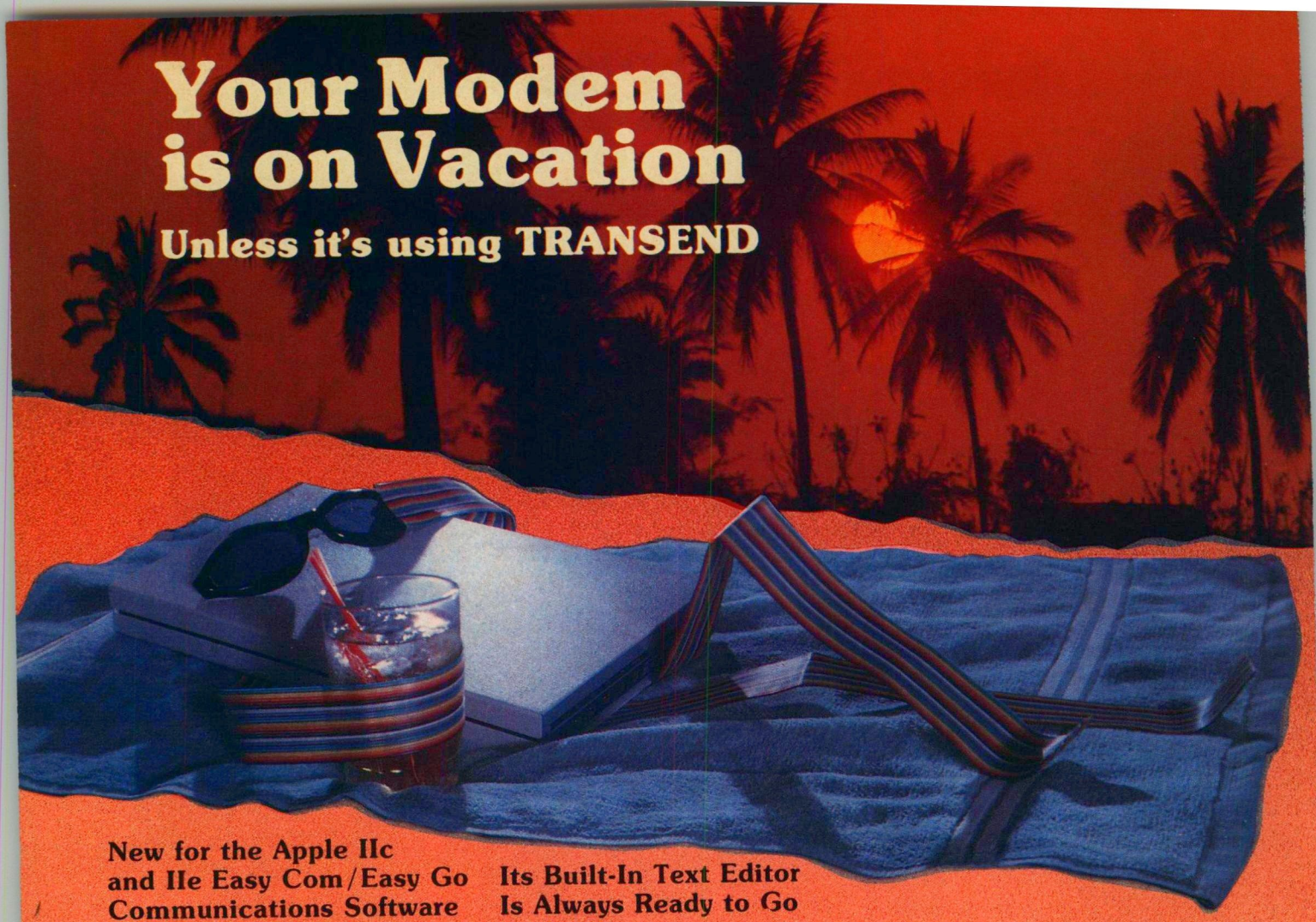

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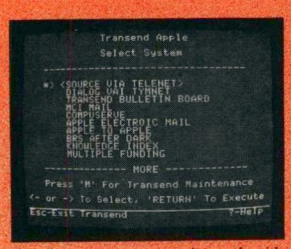
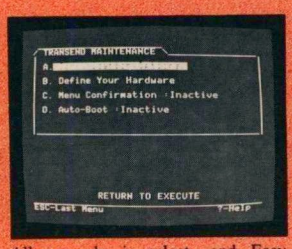
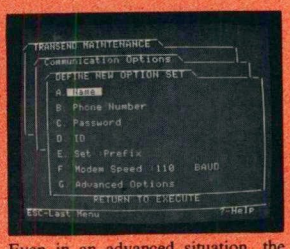


The first screen gets you in touch with a service — **preprogrammed.**



All you do is select, and Easy Com/Easy Go does the rest.



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CIRCLE 123 ON READER SERVICE CARD

PART THREE
HOME REPAIR GUIDE
APPLE II PLUS

Use all three installments of this guide to cut down your repair bills.

This final installment of the "Apple II Home Repair Guide" consists of a trouble-tree list with all serious malfunctions that do not cause your computer to alert you with a bad beep. This section also includes malfunctions that are unique and warrant separate discussion.

Keep in mind that malfunctions generally result in multiple symptoms. To use this guide, which is written according to symptoms, you will have to match your system's indications to those in the diagnostic table (see page 119). The key to your success in using this guide may lie in your ability to describe your system's malfunction in more than one way (e.g., is every other line "a solid band" or is it "inverse video."?).

Use the table to cross-check your malfunction with the trouble-tree guide. If you cannot find your malfunction here, chances are that you have a bad memory chip. It is unlikely that your ROM chips (locations F3 to F11) are bad or that the CPU has gone bad.

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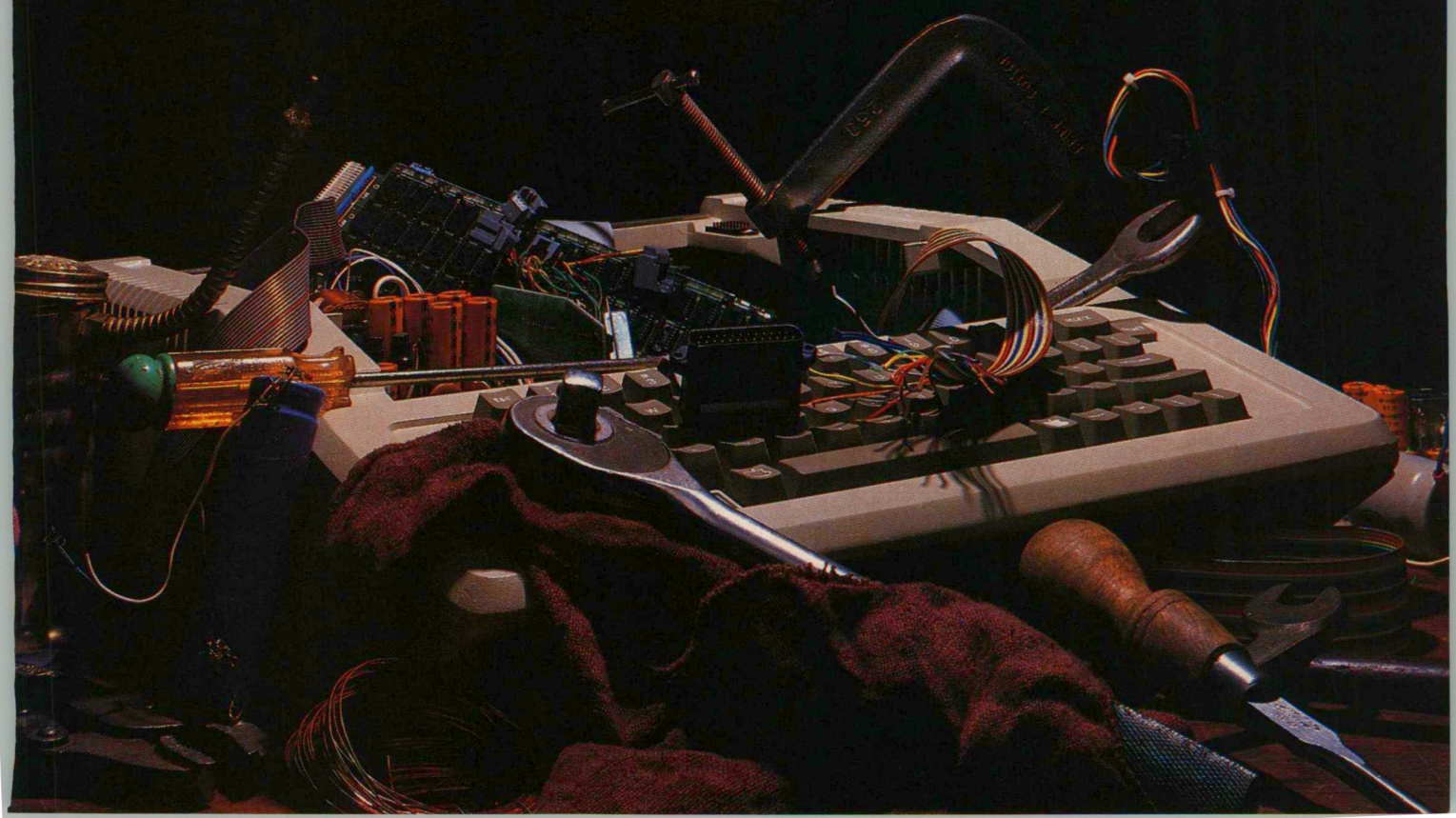

Chip	Location	Malfunction/Indication
K. Bad text, keyboard and Reset lockout, good beep		
ROM-D8	F9/10	Beeps; has Apple II at the top with no cursor present; keyboard and Reset lockout.
L. Bad text, bad GR, bad HGR/2, at least it beeps!		
74LS166	A3	Beeps; flooded or no text screen; "black flashing cursor." Reset causes beep, but you cannot see keyboard input, even though the black cursor moves. Computer doesn't appear to respond to commands because it's always flooded.
ROM SPCL	A5	Revision 7: Beeps; flooded text and a "black cursor" calling GR; text mode causes the display to flash in and out of the Text and Graphics modes. See note below under 2513 character generator.
2513	A5	Revision 0/6: Beeps; "black cursor" and vertical bars. Can call GR and HGR, which appear to be normal. Note: Revision 6 and Revision 7 character generators are not compatible.
74LS151	A9	Revision 0/6 only: Beeps, flooded text, GR, HGR, and HGR2. Accepts keyboard inputs, but flooded out in all modes. Beeps after an erroneous input. Some models can display Apple II name at the top of the screen when reset.
74LS194	A10	Beeps; flooded video in all modes; can't see because of flooded video if it's accepting keyboard inputs.
74LS02	B13	Revision 0/6 only: Beeps; display looks woven, with traversing ripples. Selecting GR removes the vertical bands in the GR video area. HGR is flooded out with noise rippling through it. Once in GR/HGR, you cannot call Text mode back. Reset causes a beep.
74LS11	B12	Beeps; Apple II name at the top and vertical line segments traversing or scrolling horizontally. GR is flooded. HGR will not call, and HGR2 has an array of flashing question marks with flashing vertical bars. Revision 7 models have a vertical row of @ signs up the left side; Revision 0/6 has a vertical row of > signs up the left side.
74LS02	B14	Beeps; top one-third of text is pulled down and slants left or right. GR, HGR, and HGR2 call OK. If you call HGR2 and then GR, the display scrambles and the system locks up.
74LS257	C12	Beeps but has a full array of @ signs. Keyboard lockout, but pressing Reset causes a beep. Revision 0/6 has vertical and alternating double sets of question marks and > signs. Some models have random characters, with every other line flashing.
74LS251	C13	Beeps; no video and no apparent response to keyboard inputs. Reset causes a beep.
74LS161	D11	Beeps; flooded video; apparent keyboard lockout. Reset causes a beep. Revision 0/6 may have lines scrolling diagonally.
74LS161	D12	Beeps; flooded video with vertically scrolling noise up the left center of the screen. Keyboard lockout until Reset; then scrambled video and a beep.
74LS161	D13	Beeps; no video or flooded video with diagonally scrolling lines in text, GR, HGR, and HGR2. Reset causes a beep.
74LS161	D14	Beeps; selecting back and forth from GR/HGR to text may flood or result in blank video with rolling noise or flashing diagonal lines. May also be blank with flipping, rolling, or scrolling noise. Any keyboard input may induce flashing video and speaker static; inconsistent indications.
74LS283	E14	Beeps; flashing array of question marks; three rows contain five A's. Keyboard lockout. Reset causes beep. Revision 0/6 has random array of characters, some flashing. Pressing any key randomly changes characters.
74LS153	E11	Beeps; three sets of four-line bands of flashing question marks on Revision 7 Apples and random letters and numbers on Revision 0/6 models. All models have some segments or blocks of random characters between the three sets of horizontal lines. Keyboard lockout, but Reset moves the random segments or blocks around.
ROM-F0	F5	Beeps; Apple II name at the top with no cursor. May have array of flashing question marks and stray characters. Keyboard lockout until you press Reset. Then you can type, but Return kicks you into the monitor.
ROM-E0	F8	Beeps; may show only Apple II name at the top with no cursor and keyboard lockout or Apple II

Chip	Location	Malfunction/Indication
		name at the top; enters the monitor at address 9102 and displays register status. Repeated attempts to exit from monitor will lock you out.
74LS259	F14	Beeps; no text; system goes straight into the GR mode with horizontal bars in video area and flashing question marks in the lower text area. Keyboard inputs not visible, but the computer will accept valid commands and beep after invalid commands. Reset causes a beep. Revision 0/6 has random characters, some flashing. Generally every other line is flashing. May have vertical columns of A's and @ signs.
74LS08	H1	Beeps; display has an array of @ signs with possible random character-size dark blocks. Reset causes a beep. Revision 0/6 has vertical columns of left brackets and A's.
M. Bad text, bad GR, good beep, good HGR/2		
N. Bad text, bad HGR, good beep, good GR		
74LS257	A8	Beeps; vertical bars in the Text mode. If you press a key, you'll get horizontal bars under vertical ones. You can call GR, and it will look normal, but since the system is stripped, this may be a false indication. HGR/2 has vertical bars. Revision 0/6 shows no problems with this chip removed.
O. Bad text, good beep, good GR/HGR/HGR2		
74LS02	B14	Beeps; top third of text is pulled down and slanted left or right. GR, HGR, and HGR2 call OK if called in that order. If HGR2 is called, then GR, the display will scramble and the system locks up.
555	B3	Beeps; no cursor. Everything else looks and calls OK. Reset causes a beep.
P. Keyboard lockout; may come up in any mode, but can't change		
Q. Bad GR, bad HGR/2, good beep, good text		
74LS194	B4	Beeps; good text. GR has horizontal bars; HGR and HGR2 are flooded. Accepts keyboard inputs. Reset causes a beep.
74LS194	B9	Beeps; good text. GR has horizontal bars; HGR and HGR2 have vertical bars.
R. Bad GR, good beep, good text, good HGR/2		
S. Bad HGR/2, good beep, good text, good GR		
74LS74	A11	Beeps; good video when system is stripped. Has elongated characters when booted with high-resolution-graphics display.
T. Erratic beep		
74LS02	A12	Beeps wildly until reset. Rolling text video. Any keyboard input produces wild beeping. No GR/HGR, or HGR2. Revision 0/6: Return may stop beeping.
74LS257	B7	No beep; screeches with static; rapid Resets may produce an array of flashing question marks with some random characters; keyboard lockout.
74LS74	B10	Wild beeping; pressing the Return key stops it, but any other key restores wild beeping.
74LS02	B13	Intermittent beeping and erratic or scrambled video; repeated Reset causes random changes. May look woven or tweedy with ripple. Keyboard lockout. Reset starts erratic beep. Revision 0/6: Clean single beep. See section L for valid Revision 0/6 conditions.
ROM:D0	F11	Two beeps; flashing array of question marks with random characters; keyboard lockout. Reset puts you into the monitor.
U. Black cursor or no cursor		
74LS166	A3	See diagnostic section L
2513/ROM SPCL	A5	See diagnostic section L
555	B3	See diagnostic section O
ROMk-F0	F5	See diagnostic section L
ROM-D8	F8	See diagnostic section L
ROM-D8	F9	See diagnostic section L
V. Scrolling/rolling video		
74LS11	B12	Beeps; has Apple II name at the top with vertical line segments traversing/scrolling horizontally. GR is flooded, HGR will not call up, HGR2 has an array of question marks with flashing vertical bars. Revision 7 has a vertical row of @ signs up the left side; Revisions 0–6 have > or # up the left side.
74LS04	C11	No beep; rolling array of question marks or color bands; keyboard lockout. See section A.

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CIRCLE 231 ON READER SERVICE CARD

NOVATION

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Chip	Location	Malfunction/Indication
74LS161	D12	Beeps; flooded video with vertically scrolling noise up the left center. Keyboard lockout until reset, then scrambled video; inconsistent characters.
74LS161	D13	Beeps; flooded video with diagonally scrolling lines in all video modes.
74LS138	F13	No beep; horizontal bars/bands. Screen gradually fills in from the top to the bottom with random color blocks and begins to scroll up the screen. See note below for 74LS138 at H12.
74LS138	H12	Same as for chip 74LS138 above. Do not swap these chips.

W. No video/blank screen (as if never turned on)

These chips are generally in the clock/timing circuits. You cannot get video or have the system operate with bad or no timing signals. Unfortunately, you are in the blind while trying to identify the bad chip. A clock crystal at location A1 rarely goes out. The chips appear in order of failure frequency.

74LS86	B2	No beep; no video.
74LS00	A2	No beep; no video.
74LS175	B1	No beep; no video.
74LS195	C2	No beep; no video.
74LS251	C13	No beep; no video.
74LS153	C1	No beep; has four distinct video areas. Mentioned here just to acknowledge its distinctiveness and as a clock anomaly.

X. Bad peripheral controls, good beep and video modes

74LS257	A8	Revision 0/6 only: Beeps; good video in all modes. Possible speaker/text/graphics problems in a fully configured system.
ROM:E8	F6	Beeps; good video but cannot process any math.
74LS138	H2	Beeps; good video, programs OK. Chip is used to control I/O and in booting disk drives.
NE558	H13	Beeps; good video. Chip controls gaming-port timers.
74LS251	H14	Beeps; good video. Chip is for I/O data-bus control.
74LS74	A11	Beeps; good video when system is stripped but has elongated characters when booted with a high-resolution-graphics display.
74LS139	E2	Revision 0/6 only (chip not on Revision 7): beeps; good video in all modes on a stripped-down system. Possible RAM/video problems on a fully configured system.

▶ DIAGNOSTIC TABLE

OBSERVABLE BAD SYMPTOMS	Branch to Probable Fix (Section)*																							
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Beep	●	●	●	●	●	●	●	●	●	●														
Text	●	●	●	●	●						●	●	●	●	●									
Keyboard Inputs**	●					●					●					●								
GR		●	●				●	●				●	●				●	●						
HGR/2		●			●		●			●		●		●			●		●					
Erratic Beep																				●				
Black or No Cursor																					●			
Scrolling Video																						●		
No Video																							●	
Bad Peripheral Control																								●

** A through J were discussed in Diagnostic Trouble Tree, Part I in the July issue of A+, pages 102-103.*

***Keyboard Input includes all the keys and the Reset button. Any response, audio or visual constitutes a "Good Keyboard" for analysis.*

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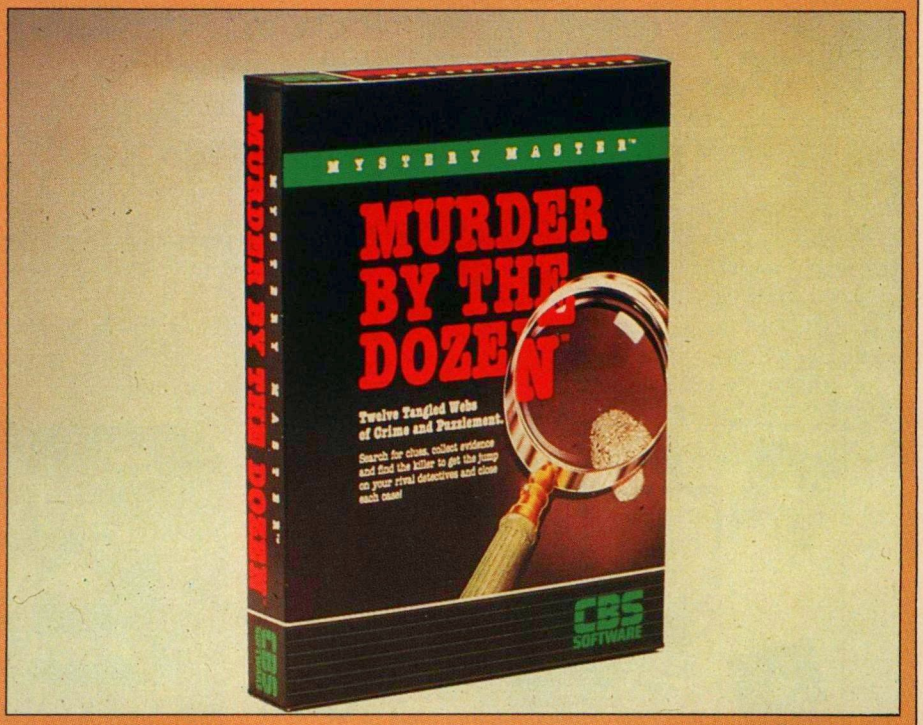
CIRCLE 501 ON READER SERVICE CARD



Murder mysteries make good books, movies, and board games. Murder by the Dozen is a computer game that combines the interest of a mystery with problem-solving challenges—an entertaining family game with educational value. That BrainBank has produced an educational game is no surprise, since the firm has also published many "courseware" products in science, reading, social studies, and grammar.

Can a computer game improve on the original concept of the mystery board game Clue and promote learning at the same time? On a computer instead of a game board, Murder by the Dozen offers 12 different cases that need solution. One to four players or teams can participate. By following leads or clues the computer gives you, you must discover the murderer, the motives, and other pertinent facts about the case.

Murder by the Dozen takes you to the City of Micropolis and assumes that you are a detective on the police department's homicide squad. Each person or team individually works on the same case, and the first to solve the mystery wins.

Like most easy-to-use programs, this one starts with a main menu, but the menu consists of 12 small hi-res pictures with a case number underneath each. You pick a case, after which the computer gives you the case history. Although you can choose any of the mysteries, the authors recommend that you play them in order.

Murder by the Dozen is a computer game that combines the interest of a mystery with problem-solving challenges.

As you read the case history on the screen, you can take notes on a Mystery Master worksheet. The worksheets help you organize information you've assembled regarding suspects, motives, interviews, and searches. They also contain a map of Micropolis, a map that you can see on the screen as you move to various locations around the city.

All players must enter their names into the Crime Computer to let the computer keep track of whose turn it is and how much time players use. Since cases should be solved as efficiently as possible, players who use the least amount of time get the first turn and, therefore, get to see the clues sooner.

You can use up your time in many ways. Interviews or short trips take five to ten minutes; trips across town can use up half an hour or more on the computer's clock. You'll find yourself wasting time talking to uninformed people or going astray. What really counts is the ability to recognize and follow up relevant leads. In real time, games take

about an hour, depending on your expertise.

As a detective you may speak with people, search rooms, examine case records, or go to any location. You get one choice for each turn, which is how you discover clues. Clue numbers appear on the screen, but you have to read the actual clues in the *Clues* book.

Twenty minutes must elapse on the game clock before you can announce a possible solution. You must have enough information to identify the murderer and to be able to gain a conviction in court. Whenever you are ready to present a solution, you explain it to the other players and then confirm it in the *Solutions* book. The other players do not read the solution. If you are correct, you win, but if you are wrong, you are out of the game, and the others continue playing.

Even Sherlock Holmes or Lord Peter Wimsey would have been challenged by these mysteries. Each has several suspects with credible motives. The cases run the gamut from undercover cop Theo Demarcus being stabbed during a church confession to socialite Leonora Tibbet being beaten to death with a hospital bedpan.

Players must be able to take good notes, organize facts, and eliminate irrelevant details in order to deduce the murderer's identity.

The 12 different cases and their solutions are a permanent part of the program and cannot be changed. Once you've solved the cases, you might want to pass Murder by the Dozen on to a friend who has not played the game.

The reward for solving cases, other than the inherent gratification, is earning a good "sleuth rating." The 12 ratings, which range from Lucky Guesser to Innocent Bystander, are based on the time you take to solve a case.

Solving a mystery involves logic and reasoning skills. Players must be able to take good notes, organize facts, and eliminate irrelevant details in order to deduce the murderer's identity.

Murder by the Dozen has educational value for home or school. Although it does not fit into any set subject area, it does help players improve their thinking skills, teamwork, and might even fit into a computer-literacy program. The game does not fit into a 45-minute class, however.

This product uses nice hi-res graph-

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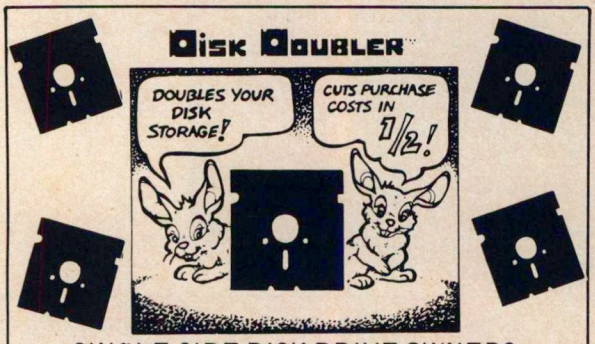

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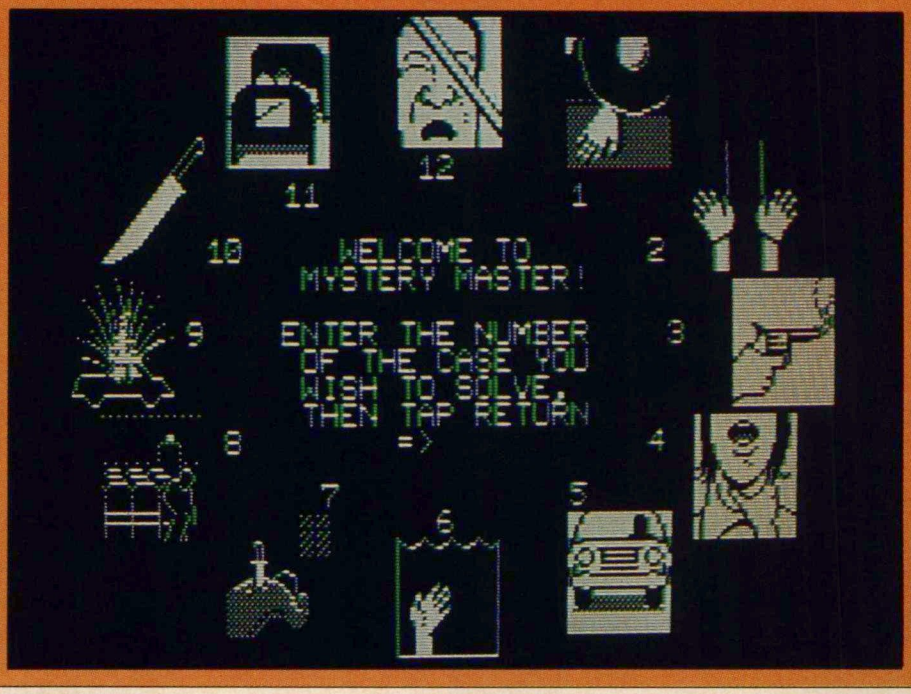
CIRCLE 387 ON READER SERVICE CARD

ics, which add to its enjoyment, but some aspects of the program do not fully employ the computer's capabilities. You spend considerable time looking at the *Clues* book and taking notes. We suspect that the clues are in a book rather than on the screen, to prevent players from seeing each other's clues. The game requires honest participants, though, since players may remember clue numbers their opponents have discovered and can read them when they search for their own clues.

Unfortunately, the computer is incidental to the *Clues* and *Solutions* books, when it should be the other way around. A solutions menu would be preferable, in that it would involve the computer more.

No Mystery to Run

The games all follow a similar easy format. You begin with the main menu of cases and simply follow the instruc-



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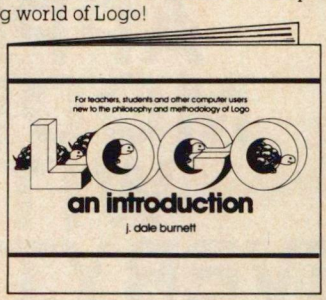

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tions on the screen. Using the program is no mystery. Although the authors suggest that you read the *Detective Manual*, which contains many useful tips for solving cases, you can easily bluff your way along.

No matter if one or four players or teams use the program, it still runs on the slow side. The program frequently accesses the disk and repaints the screen with menus, and you often have to ask it to display the map.

On each turn a new screen display gives you your location, a series of choices, and the option to solve the case, all of which takes time. If you choose to look at the map, the program has to access the disk. We found it much simpler to refer to the map on the Mystery Master worksheet.

Documentation

This package includes three booklets and a pad of Mystery Master worksheets. The *Detective Manual* is a concise 24-page booklet that tells you how to set up your computer and gives you the official rules, tips for investigations, case histories, sleuth ratings, and a Copyright Law notice.

The program frequently accesses the disk and repaints the screen with menus.

The *Clues* book contains 700 numbered clues, and the *Solutions* book gives you 23 pages of solutions to the cases. The solutions are written in red, and you need a red plastic decoder to read them.

CBS Software comes with the usual 90-day warranty, and the company replaces defective disks without charge. After 90 days, you'll have to pay $5. Make sure that you send in your registration card.

CBS does not yet offer customer support. You should require little, if any, help with this program, but if you do, we suggest that you contact either your dealer or BrainBank. We have always found the people at BrainBank to be helpful and interested in users of their products.

More Murders

Murder by the Dozen is fun and educational for mystery enthusiasts, but by making you refer to three books, it fails to capitalize on the computer's capabilities. The program does stimulate problem-solving, reasoning, and organizational skills, however. Since a dozen mysteries can only last so long, we expect to see more in future volumes from CBS.

Doug and Denise Green

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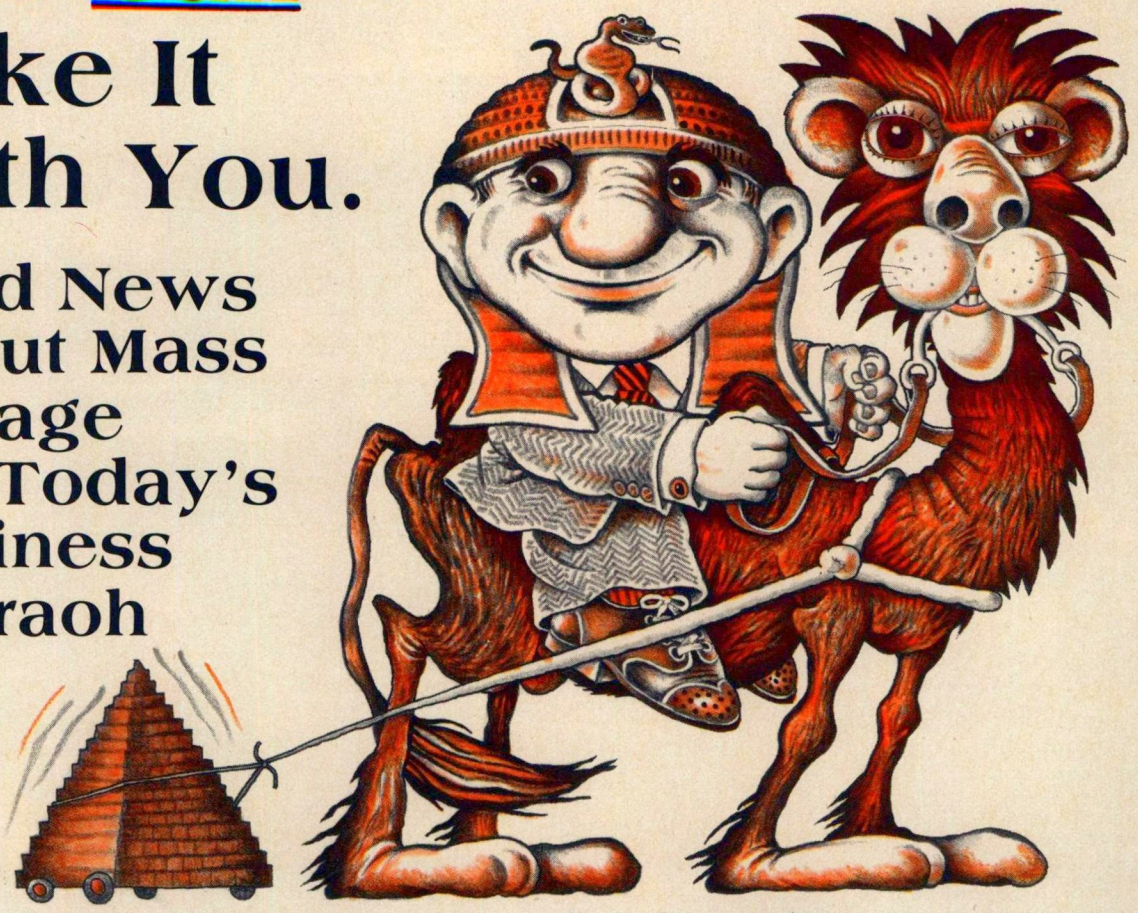

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CIRCLE 502 ON READER SERVICE CARD

Most entertainment software contains one game per disk, though much of the disk remains unused. What happens when a programmer packs a disk full of games, much like single songs on a record album? For programmer Paul Coletta, his selections turn out to be a mixed bag of games.

Apple Graphics Games, a collection of ten games on one disk, also contains a book that provides program listings and explains the fundamentals of game graphics. Although the package does not say so, the games and the book seem to be geared toward a young audience. The games—Match, Piano, Pairs, Catch, Boxes, Poker, Equate, Spiral, Lander, and Spider—are as simple as their titles. Unfortunately, their quality varies as much as the selection.

The main menu offers graphics more elaborate than do all the games combined. The screen fills with vertical blue, black, white, and beige stripes, like a curtain at a theater. Slowly, the curtain parts, revealing two columns of games separated by what appears to be the American flag. Actually, Old Glory has black and white stripes with a purple star field. You press the space bar to move an arrow to a particular game and press the Return key to load the game from the disk.

Match

The first game, Match, is an electronic version of Mattel's Perfection and Superfection games. The central grid contains 20 different outlines of shapes, such as crosses, diamonds, squiggly lines, and squares. Thirty shapes, of which 20 duplicate the outlines, surround the grid's perimeter. You pick a shape from the perimeter, maneuver it across the grid, and place it inside the outline before time expires.

The graphics are in black and white, with a splash of purple thrown in for the timer. You choose a shape by pressing the space bar and maneuver the shape

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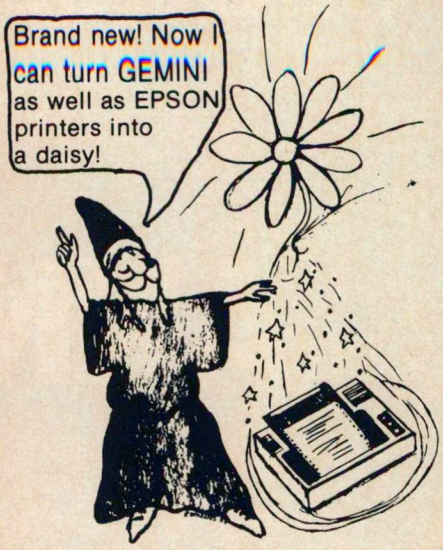

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across the grid by pressing the Escape key for vertical movement and the Return key for horizontal movement.

The controls take a great deal of practice to master because each key can move the shape in two directions at two speeds. When you become frustrated trying to nudge a shape into position, you press the space bar to send the shape back to the perimeter.

Despite the clumsy controls, Match is a fast and exciting game that challenges your reflexes and tests your spatial perception.

Piano

Piano is more an educational tool than a game. It turns your Apple into a concert piano with an octave-and-a-half range centered on middle C. Piano will

Pairs could use more color to liven up the screen, though, and you may miss seeing the washers, dryers, and dinette sets turn up behind the squares.

accept whole, half, and quarter notes and rests, but you cannot play chords. You can change the tempo at any time and can save your concertos, minuets, and polkas on a separate disk.

The keyboard is black and white and set within a purple field. You "tickle the ivories" by pressing the top row of lettered keys, from Escape through P for notes F through B, or 1, 2, 3, 5, 6, 8, 9, and 0 for sharps and flats. Each note is transferred to a staff that displays 20 notes at a time and scrolls to add, delete, or review notes. You press the Return key to play back your tune.

Piano is a cute music program that should hold the attention of a young child. Notes are easily entered, altered, or deleted. An octave-and-a-half range limits the songs you can compose, but most lullabies and nursery rhymes require only a few notes.

Pairs

Pairs, which requires a pair of players, is the electronic version of the TV game show "Concentration." Various symbols, including tanks, boxes, and aliens, are hidden behind a 10×14-square grid. You try to match the symbols by choosing two squares. The player with the most matches wins.

The graphics are displayed in black and white. To pick a square, you maneuver cross hairs across the grid with the Y, G, H, and B keys, and then press Return to expose the symbol behind the square. If the symbols match, you continue playing.

If you like "Concentration," you will enjoy Pairs, which accurately duplicates the game show. Pairs could use more color to liven up the screen, though, and you may miss seeing the washers, dryers, and dinette sets turn up behind the squares.

Catch

Catch makes you move a U-shaped catcher across the Bottom of the screen to catch falling stars. When you catch one, you press a button to disintegrate the hapless star. You can position the catcher on one of three levels. The higher the level, the more points you score per disintegrated star. Stars that reach the ground subtract points from your score.

Despite a multicolored star field in a night sky, the stars you catch are white balls. You use a paddle to move the catcher horizontally and vertically across the three white lines that delineate the levels. The controls are fast and responsive.

Catch offers a brilliant display of graphics but boring game play. You will find it more challenging to go outside and look for a real meteorite.

Boxes

Boxes recreates the children's game of connecting dots to form boxes. This two-player game sets up the dot field, lets you draw the lines, and then initials the boxes you've formed.

Boxes requires two paddles, one for each player. The controls are responsive, although you may need some practice to place the cross hairs accurately between two dots. You can choose from four different sizes of dot fields.

If you like the children's game on which it is based, you will enjoy Boxes.

Poker

Poker contains only one option: five-card stud for two players. The cards are dealt face up, and you place bets after each card. Players start with $325 in chips and can bet, call, raise, pass, and fold.

The square-shaped cards contain a single number or letter and suit. Shuffling provides the most fun of the game

Poker with cards offers a greater selection of games, an easier format, and more excitement and suspense.

as the cards flick up and down while staccato clicks sound from the speaker. You can easily control the paddle.

Poker with cards offers a greater selection of games, an easier format, and more excitement and suspense than Poker, the computer game, though.

Equate

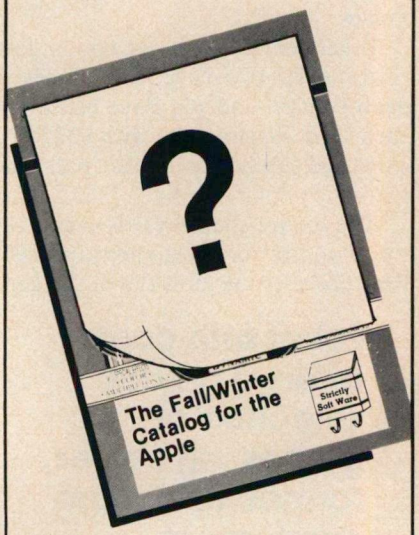
Equate, another two-player game played with paddles, tests your mathematical reflexes. Players maneuver their cursors across a 9×9-square grid in search of three numbers in a row that plug into the formula $A \times B (+ -) C$ and equal a computer-generated number.

Equate displays the numbers, formula, and scores in reverse video, which can annoy you after a few rounds. The paddle controls border on abysmal as you tend to overshoot numbers and pick the wrong series of three.

Equate starts out as a good mathematical exercise, but poor graphics compounded by miserable controls subtract enthusiasm from the game.

Spiral

Spiral is the electronic version of Spirograph or Etch-a-Sketch. You create all sorts of geometric doodles by entering R (right) and L (left) commands that turn an individual line 45° or 90° at a time. You can also rotate the entire



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design 45° or 90° and enlarge or shrink your design.

The graphics depend on your imagination. You can draw a design anywhere on the screen. The controls faithfully execute your commands, and you can insert and delete individual commands. Although a line can be white, purple, or green, you cannot fill a design with color unless you spend the time putting each line next to the other.

Spiral illustrates what happens when a computer makes a simple task time-consuming and monotonous. You have less fun entering commands than drawing a line yourself. Geometric doodlers are better off using Spirograph or Etch-a-Sketch.

Lander

Like the coin-operated arcade game Lunar Lander, Lander puts you at the controls of a spacecraft ready to land on a planet. You control the amount and direction of thrust needed to bring your ship down safely onto one of six platforms. The narrower the platform, the higher the score, but you only have a limited amount of fuel.

The graphics are terrible. The lander looks like the map symbol for a bridge—two parallel lines flared at the ends. Only the timer is in color. Lander does not display vertical or horizontal speed like other Lunar-Lander-type games. The paddle controls are fast and responsive.

Lander does not provide much of a challenge, except maybe for children. Unfortunately, the graphics are so poor that the game probably will not hold even a child's attention very long.

Spider

The last of the ten games, Spider, contains the excitement that Lander lacks. As a fly, you try to eat all the spider's eggs before time expires, without becoming entangled in a web. Spiders do not actually chase you, but small webs appear in your wake, forcing you to maneuver constantly or get caught. When time expires, points are totaled and you advance to a higher, more difficult level.

The graphics are adequate. Every shape is colored green and looks as it should, except the spider, which has only six legs instead of a real spider's eight. You quickly turn the fly using the keyboard controls—the A and Z keys for vertical movement and the arrow keys for horizontal movement.

Spider is the best game on the diskette, offering you challenging fun and frenetic play.

Instructions

The games' instructions are contained in the 218-page book included with the diskette. The instructions explain the games and the keyboard/paddle controls clearly and thoroughly and provide examples of play.

Small webs appear in your wake, forcing you to maneuver constantly or get caught.

Most of the book, however, contains the BASIC program lists for the games and the shapes used in the games. Additional pages define each game's variables, arrays, and logic. One chapter explains how shapes are created and drawn on the screen. Another chapter briefly discusses how to add sound to a game. By studying the games' documentation, you may learn a few things about BASIC graphics.

Mixed Bag

Overall, the games are simple and contain only rudimentary graphics that do not fully utilize the Apple's abilities. In fact, most could be played on a monochrome monitor without any visual difficulty. Whiz kids and veteran joystick jockeys will not be impressed with poor remakes of the video game Lunar Lander, the TV game show "Concentration," and Spirograph or Etch-a-Sketch toys. Children might enjoy some of the games, but the graphics may not hold their attention.

Apple Graphics Games is like a record album. Of the ten selections, some are captivating, others passable, and a few downright boring. You get a fair introductory tutorial on game logic and graphics creation, but only a mixed bag of games.

Russ Lockwood

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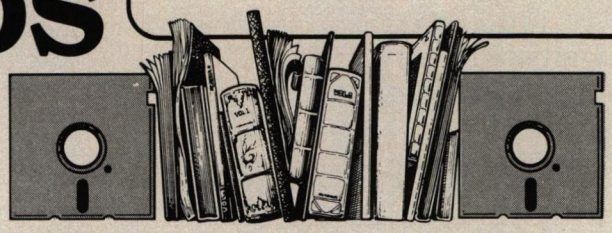

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GAME FEATURE

THE ODDSMAKER

The Olympics, a majestic athletic event coinciding with leap years and U.S. presidential elections, glues millions of people to their television sets. For those viewers who are thinking of embracing the Olympic spirit by forming office pools, CZ Software has a way to keep track of all those contests—and, of course, all the bets.

The Oddsmaker, by John Zieg, is a pari-mutuel betting system that functions as a giant bookkeeper. It keeps

The Oddsmaker, by John Zieg, is a pari-mutuel betting system that functions as a giant bookkeeper.

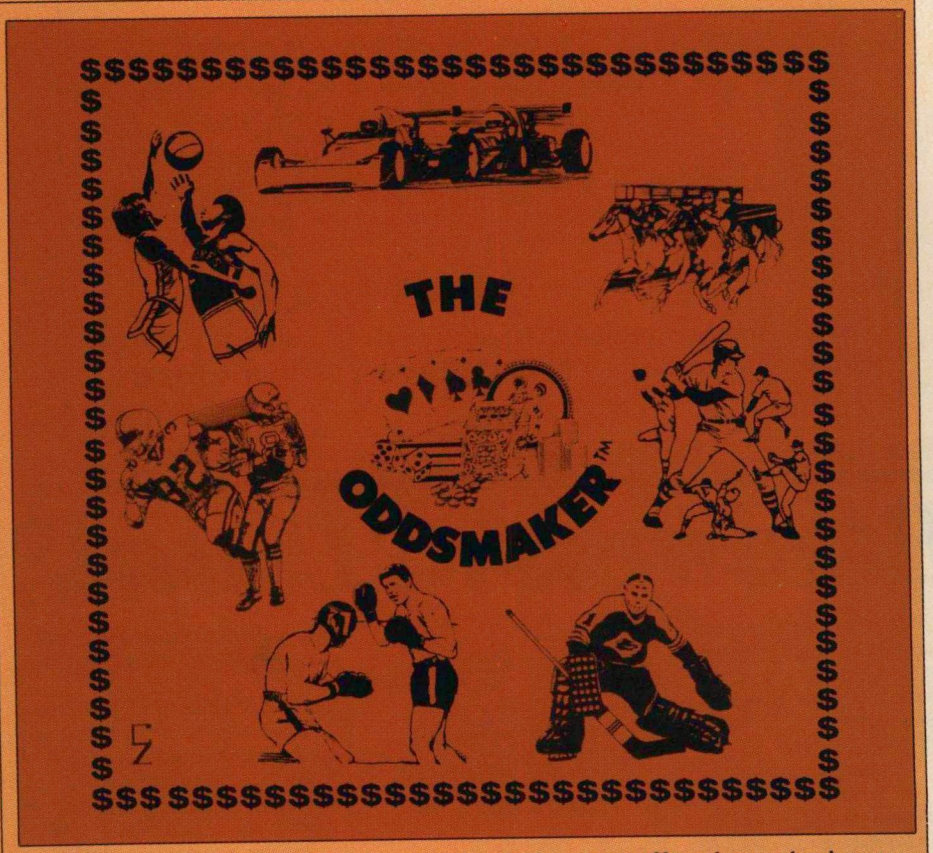
track of up to 14 betting pools for a single betting event. It stores the names of those who made bets and how much they wagered, and it even prints out a ticket for both the bettor and the cashier.

Pari-mutuel What?

Pari-mutuel betting divides the bets on a single event into several betting pools. For example, a 100-meter dash with eight athletes participating would have eight betting pools, one for each runner. Each pool contains money bet on that runner to finish first.

The pot equals the combined amount of money in all betting pools. All bettors who put money into the winning pool receive a share of the pot that is equal to their percentage of the winning pool. Continuing the example, each pool contains $10, so the pot equals $80. If runner number 4 wins, pool number 4 is the winning pool.

Suppose two people place $5 each into pool number 4. Since each person holds 50% of the winning pool, each receives 50% of the pot, or $40 each.



So far, you can do all this in your head. The pools are the same, the odds are the same, and the payoffs are the same. What happens when nobody bets on runners 6 and 7 and a lot of people bet on runner 3 though? How does this situation affect odds and payoffs? What happens when you add dozens of events, or events such as the decathlon, which are made up of ten separate contests?

Electronic Bookie

The Oddsmaker and your Apple come to the rescue. The Oddsmaker saves, on one disk, up to 14 betting events, each with up to 14 betting pools. It automatically keeps track of the bets, prints tickets, and calculates odds and payoffs.

You can enter descriptive titles for each pool, ticket, and pot; turn ticket printing on or off; and save the data to disk and recall data from the disk.

The heart of the program lies in entering the bets and calculating odds and

The heart of the program lies in entering the bets and calculating odds and payoffs.

payoffs. Entering a bet is as easy as typing in the bettor's name, the betting pool, and the amount. If you are not printing tickets, you can leave the name out.

The program then asks for a confir-

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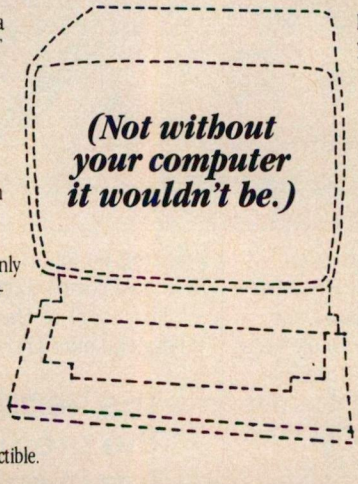

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mation. If you press Y, the bet is entered. Anything else results in a cancelled bet. If somebody withdraws from the pool or an incorrect bet was entered, the program accepts negative numbers. As you add bets, the program updates the odds and payoffs.

The program also includes the house cut, which is the percentage of the pot that pays the expense of running the betting operation. As the house cut changes, so do the odds and payoffs. The Oddsmaker keeps track of these activities automatically.

Screens appear quickly, alterations are made as fast as you can type, and odds and payoffs change instantaneously.

The program does not store the names of bettors. It prints them on tickets, but does not save them to disk. Winners just have to hold on to their tickets.

The Oddsmaker runs smoothly. Screens appear quickly, alterations are made as fast as you can type, and odds and payoffs change instantaneously. All in all, it is an efficient program.

So, who can use The Oddsmaker? Anyone who runs pari-mutuel betting systems. Before you ask the FBI to raid CZ Software, please note the following message that appears on the packaging: "The Oddsmaker is intended for entertainment use only."

If your Olympic entertainment includes more than a few side bets, you should look into The Oddsmaker. Chances are it's a good bet.

Russ Lockwood

PRODUCT INFORMATION

CZ Software
358 Forest Road
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(617) 771-4155
List Price: $44.95
Requires: Apple II, II Plus, or IIe; one disk drive

PRODUCT NEWS

The Heist
This adventure centers on dashing super spy and great guy Graham Crackers. Crackers quickens your pulse as he uncovers a terrorist plot to destroy the world.

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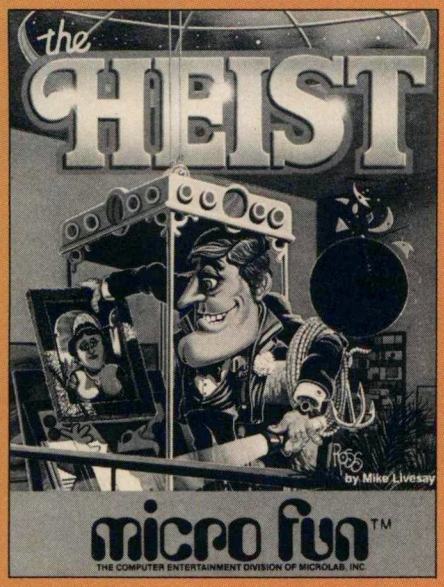

Crackers must undermine the plot.

The evil doomsday plans are concealed on microfilm in one of the art pieces, and there are 144 rooms of art. Sweeper drones, man-eating robots, death traps, and the limits of your own fortitude stand between super spy Graham Crackers and life on earth. *(List Price: $39.95)*
Requires: Apple II, II Plus, or IIe; 48K RAM; one disk drive; joystick
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Joust combines a medieval tale with survival of the fittest as you battle against natural disasters, armed raiders from the Dark Region, and birds of prey. In Battlezone, a strategy game, you must outmaneuver enemy tanks, evasive fighters, and flying saucers.

The game Pole Position offers you four levels of difficulty as you drive a Formula One racing car. Ms. Pac-Man is the familiar maze game in which you must eat the dots and avoid the ghosts.

In Moon Patrol, you are the captain of a land cruiser patrolling the moon's surface. Deep craters and gigantic boulders threaten to destroy your moon buggy, and alien spaceships try to thwart your mission.

To play Galaxian, you must blast invaders that swoop from the sky in a complex S-curve. Each destroyed wave of attackers is replaced by another even faster and more powerful wave.

The last game, Jungle Hunt, requires you to save a damsel in distress while swinging on ropes from tree to tree and battling ferocious alligators. *(List Price: $34.95 for each disk; $44.95 for each cartridge)*
Requires: Apple II, II Plus, or IIe; 48K RAM; DOS 3.3; one disk drive
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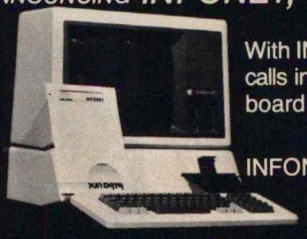

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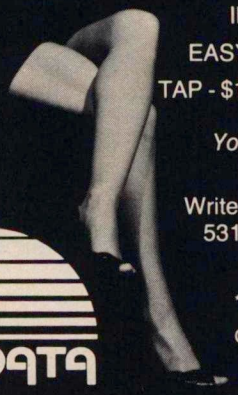

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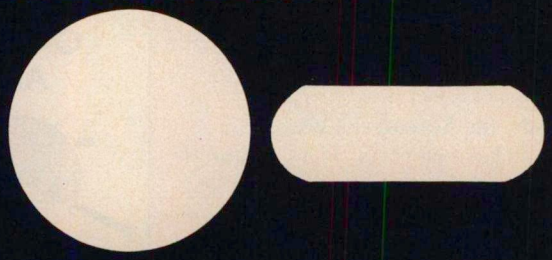

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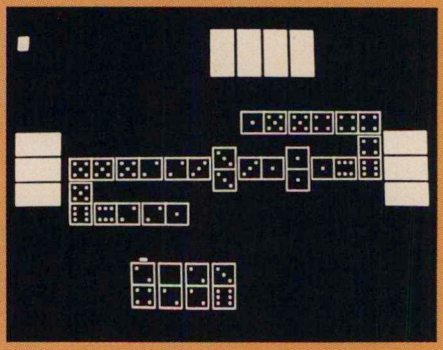

play are available, novice through expert. The package includes a 28-page manual that describes the game and strategies and provides graphic illustrations showing how to play the computer version. The program itself uses graphics to simulate the playing table. *(List Price: $29.95)*
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Games for SuperSprite
Three games are now available for use with the Super Sprite graphics peripheral board. A maze/pursuit adventure called KOBOR features fast animation, sound effects, and speech. Baseball Sprites is a lifelike rendition of a baseball game, complete with crowd noises and umpire calls. Assembly Line Madness challenges you to match auto parts to cars on a fast-moving assembly line. *(List Price: $39.95 each)*
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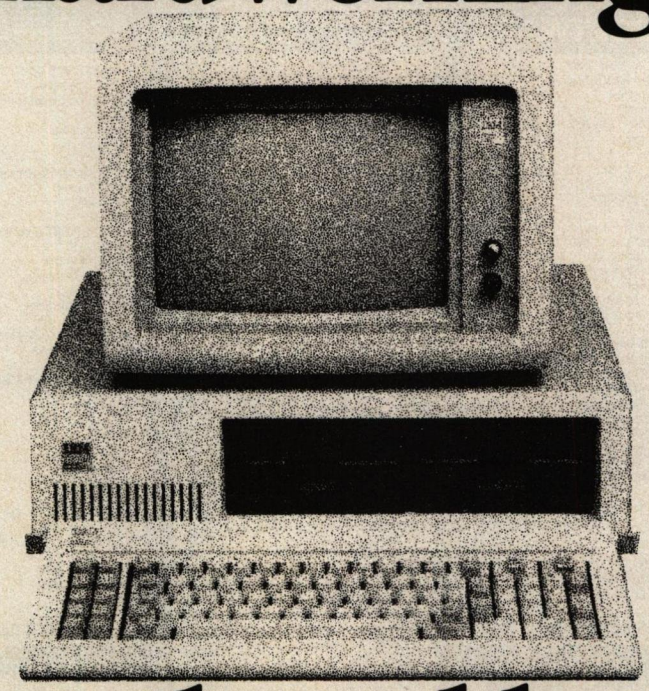

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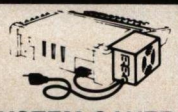

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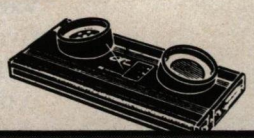

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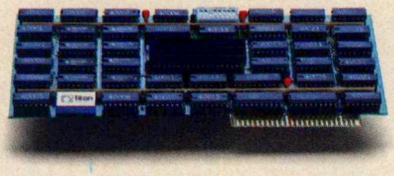

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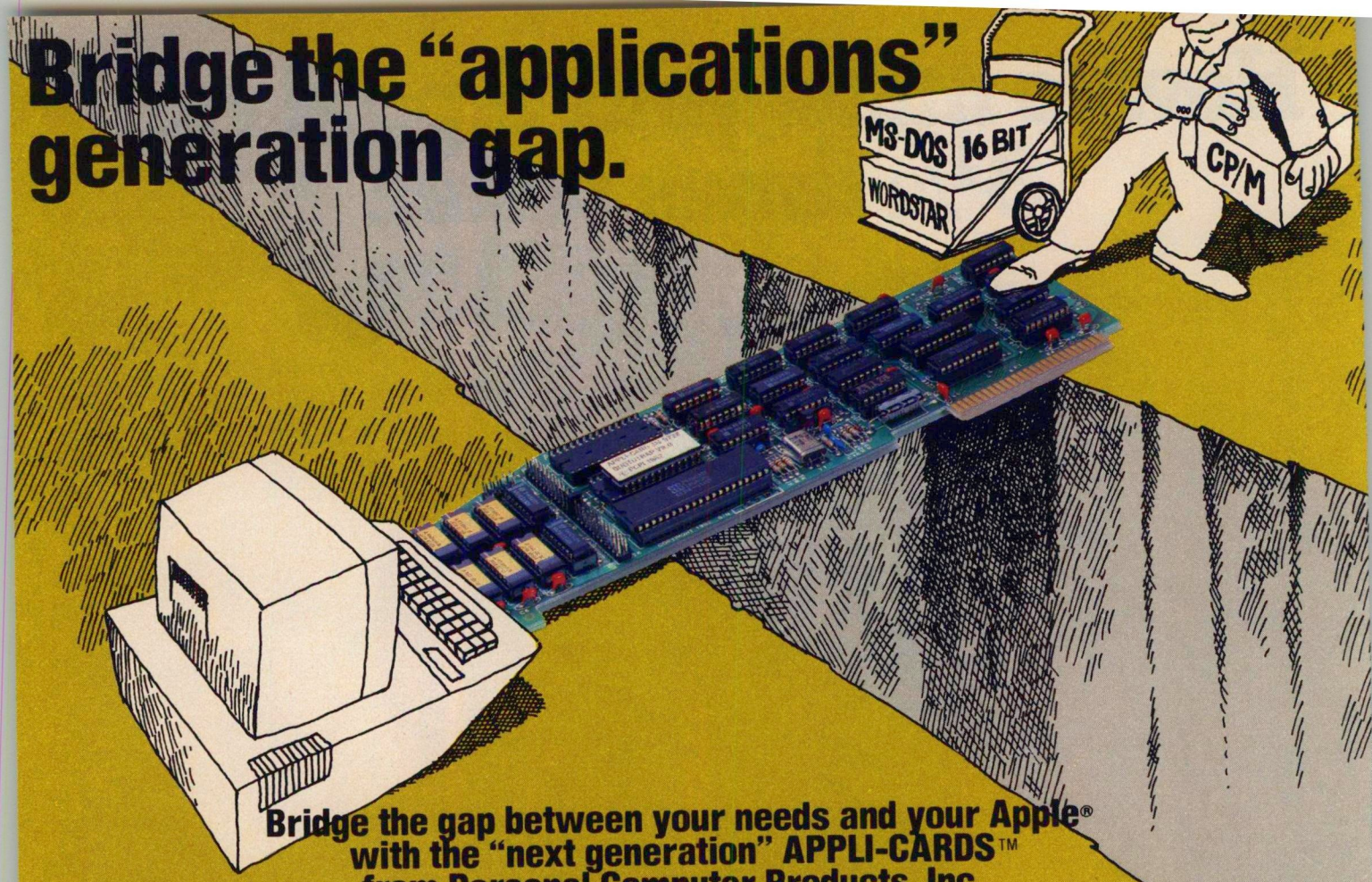

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N-Squared Market Analyzer is a program that enables people who invest in stocks, bonds, futures, and the like to manipulate and plot data quickly and easily. Written in Applesoft BASIC, this program is menu-driven and error-free, and it has extensive data-manipulation abilities. You can create almost any desired indicator or expression, plot it, compare it with another indicator or index, and then refine it with the program's many analysis aids.

Data Management

The Market Analyzer includes a data diskette that contains data compiled from Barron's Market Laboratory pages going back to September 1980. You can update this database quickly either manually at the keyboard or automatically through a modem. The data is *not* restricted to what you receive with the program. You can create your own database with any type of numerical data with which you want to work. The only restriction is that the data within any data file must be of the same frequency—you cannot mix daily, weekly, and monthly data in the same data file.

When you boot the program diskette, you get the Program Selection menu, which takes you to the main program, "The Market Analyzer," or to the various data-management and update options. Selecting an item on the menu requires only a single keystroke. In fact, any time your response is only one character, you don't have to press Return.

The next menu contains plotting sizes. You can choose 52, 70, 104, or 208 time periods (see figure 1). These numbers work best for weekly data, since most of them are multiples of 52, but you can opt for other frequencies. After you select a plotting size, the program asks you to insert your data diskette into drive 1 or 2. If you have only one disk drive, you must remove the program diskette and insert the data diskette; with two disk drives, the data diskette can remain resident in drive 2.

The next step is to select the data files with which you want to work. A data file can consist of up to nine data sets plus one set for the date. The date, which is a common item in all the data files, is always the first file entry. The grouping of the data within the different files is arbitrary, and you can rearrange it for convenience and easy updating. An example of a data file is MKT TRNDS (Market Trends). This file could contain the following data: Date, Advances, Declines, New Highs, New Lows, Active Up, Active Dn, NY Vol Up, and NY Vol Dn—this is just the data in one data set. The database diskette that comes with the program has more than 130 data sets arranged into 20 data files (see figure 2). The program will keep you updated on the space remaining on the data diskette. The documentation contains an entire section devoted to the manipulation and creation of your database.

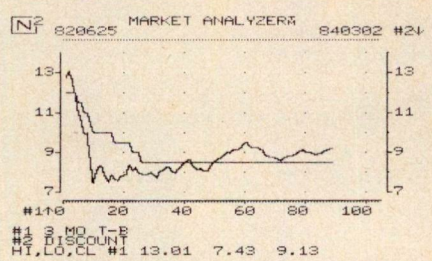

Figure 1: The average rate on 90-day T-Bills compared with the Discount Rate. The time period was changed to 70 weeks.

Managing Your Database

You use the Edit-File program to manage your database. The first selection in this program is Update Files, which you use for normal updating of the database. Update files is quick and simple to use, and, like the other parts of the program, it will never leave you hanging or wondering what button to push next. It even lets you correct entries before it saves them on diskette.

The second selection is Edit/Update Files, which also allows you to update but is much slower because it loads the entire file's contents into the memory so you can perform various other operations on the data. Within this selection, you can list all of the data in the loaded file. In fact, you can even select a slow or fast speed for the listing. The Adjust function allows you to change the data by adding, multiplying, or dividing by a constant. You can use this function for stock splits if your data consists of stock-price information such as open, high, low, close, and volume. The Change function allows you to correct past errors, the Delete function works for single entries or multiple entries, and the Print function allows you to print any number of data records. The Sort function lets you append data to the beginning of a data file.

The third selection in the database-

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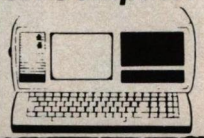

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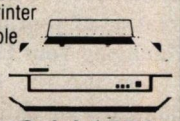

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N-SQUARED MARKET ANALYZER PROGRAM DATA BASE CONTENTS

OPT STATS 09	MKT TRNDS 09	STK NDXES 09	DOW AVRGS 10
DATE	DATE	DATE	DATE
CALLS UP	ADVANCES	NYSE COMP	DJI HIGH
CALLS DN	DECLINES	NYSE IND	DJI LOW
CALLS UNC	NEW HIGHS	NYSE UTIL	DJI CLOSE
CALLS TOT	NEW LOWS	NYSE TRAN	DJ TRAN
PUTS UP	ACTIVE UP	NYSE FINL	DJ UTIL
PUTS DN	ACTIVE DN	AMEX COMP	DJ 65STKS
PUTS UNC	NY VOL UP	OTC COMP	UTIL BOND
PUTS TOT	NY VOL DN	S&P 500	IND BOND
			GVT BOND
FRS RATES 06	FIN RATES 09	MNY RATES 09	FED CNDTN 09
DATE	DATE	DATE	DATE
FED FUNDS	CD 1MO	LO PRIME	LNS&SEC
T-BILL	CD 1YR	HI PRIME	SECRTES
COM PAPER	BA 1MO	HI FFNDS	C+I LNS
CD'S	BA 6MO	LO FFNDS	RE LNS
EURO$	TB 3MO	CL FFNDS	TM DPSTS
	TB 6MO	OF FFNDS	FRS ASSET
	TB 1YR	LO CALL$	DEM DEP
	MMF YIELD	HI CALL$	FRS LIAB
BRN 20STK 05	MNY MSURS 05	BND STATS 08	BRN 50STK 07
DATE	DATE	DATE	DATE
20MA PR	WFP NDX	BOND VOL	B50 PRICE
20MA VOL	BUS FAIL	BOND OFR	B50 QTR $
20LP NDX	WLSHR NDX	STK OFR	B50 5YR $
20LP VOL	MMF ASSETS	BOND YLD	B50 1YR $
		BRRNS CI	B50 B/S %
		B/S SPRD	B50 DIV %
		MUNI YLD	
MBR TRDNG 10	FRS BANKS 06	STK SALES 08	PAT TESTS 09
DATE	DATE	DATE	DATE
TOT SHORT	GVT ISSUES	NYSE VOL	CONSTANT
PUB SHORT	TOT CREDIT	AMEX VOL	RAMP
MBR SHORT	CASH CIRC	OTC VOL	SQR WAVE
SPC SHORT	FREE RES	DJI VOL	STEP
MBR PURCH	MONY BASE	DJT VOL	SAW TOOTH
MBR SALES		DJU VOL	ALTERNATE
ODD PURCH		DJ 65 VOL	STAIRS
ODD SALES			TRIANGLE
ODD SHORT			
A-D GROUP 10	E-L GROUP 09	M-P GROUP 09	R-T GROUP 08
DATE	DATE	DATE	DATE
AIRCRAFT	ELECT EQPT	MACH TOOLS	RAILROAD EQ
AIR TRANS	FARM EQUIP	MACHINERY	RETAIL MERC
AUTOMOBILE	FOOD & BEV	MOTION PIC	RUBBER
AUTO EQUIP	GOLD MNG	NF METALS	STEEL/IRON
BANKS	GROCERY	OFFICE EQ	TELEVISION
BLDG M&E	INSTL FIN	OIL	TEXTILES
CHEMICALS	INSURANCE	PACKING	TOBACCO
CLOSE INV	LIQUOR	PAPER	
DRUGS			

Figure 2: The database diskette contains more than 130 data sets arranged into 20 data files.

management program is Create New Files. Other operations include Delete Data Files, Truncate Files, Verify Files, Rename, and Copy. The program also includes routines for converting other popular databases, such as Computrac, into the N-Squared format.

Operations and Manipulations

The operational characteristics of the Market Analyzer are as extensive and useful as are the database-management abilities. The arithmetic operations are addition, subtraction, multiplication, division, and powers. You can take any data set and select the arithmetic operation you desire—the program performs the operation with any constant of your choosing. You can also perform the same operations with any two data sets, with the additional ability of calculating percentages.

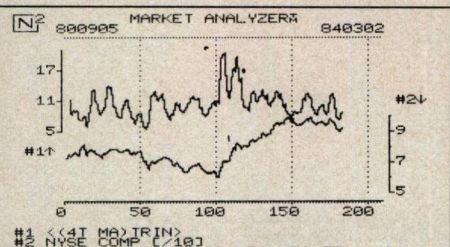

Figure 3: A comparison of the four-week moving average of the Short Term Traders Index (TRIN) to the New York Stock Exchange Index.

Other calculations that the program can perform on the data sets are Running Sum, Running Difference, Arithmetic Moving Average, Exponential Moving Average, Deviation from Trend, Rate of Change (Momentum), On-Balance Sum (On-Balance Volume when relating price and volume), Switch, Copy, Log, Exp, Sgn, Usr, Norm, Sin, Cos, Tan, Atn, and Shift. The documentation adequately explains all of these data-set operations with examples. The Usr function even allows you to incorporate an expression of your own.

The plotting features are also comprehensive. Automatic vertical scaling maximizes the resolution of the plotted data. The horizontal scale depends on your selection of 52, 70, 104, or 208 time periods.

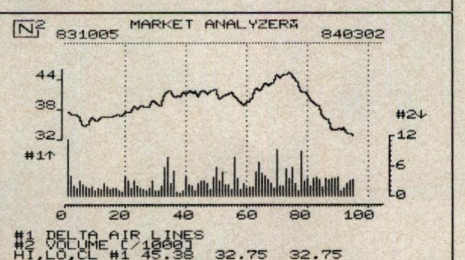

Figure 4: An example of how you can maintain and work with charts of individual stocks and commodities.

Loaded with Options

Another impressive feature of the N-Squared Market Analyzer is its ability to set default parameters of your choosing so that each time you boot the program it uses the parameters you have selected. You can change the default parameters temporarily during program use, though.

The plotting and printing parameters are

1. Single/Split Screen—You can plot one or two indicators on the screen while controlling the overlap of the two.
2. The second plot (if you select two) can be a line chart or a bar chart. A bar chart looks like a histogram display and is similar to the usual method of displaying stock-volume information.
3. An On/Off choice for the grid is available.
4. A time-lag feature lets you compare indicators by using a variable time offset. You can use this feature for centering moving averages.
5. The program includes controlling parameters for hard-copy graphics.

While the plot is on the screen, a movable cursor helps you identify data precisely. A data-readout feature works with the cursor and displays the date and the value of each set at the particular cursor location.

While the plot is on the screen, a movable cursor helps you identify data precisely.

Threshold-crossing indicators can appear on the screen to indicate when a selected set exceeds a predetermined value. This indicator can help you optimize strategies involving moving averages to determine "buy-hold-sell" techniques.

Documentation

The documentation comes in a quality three-ring binder divided into four sections: Program Description, Operational Techniques, Data Base Management, and Notes. The program also includes a 35-page booklet, *The ABC's of Market Forecasting*, by Martin E. Zweig. This booklet is an excellent reference on the meaning and possible intrepretation of some of the data in the Market Laboratory section. The documentation is straightforward and com-

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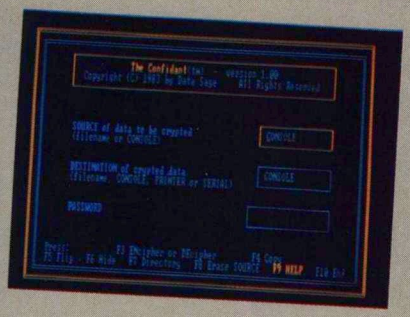

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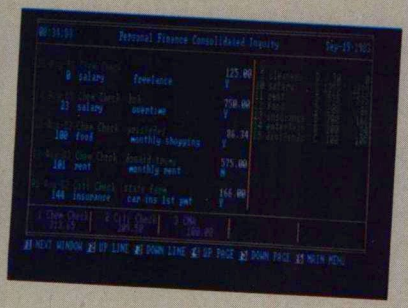

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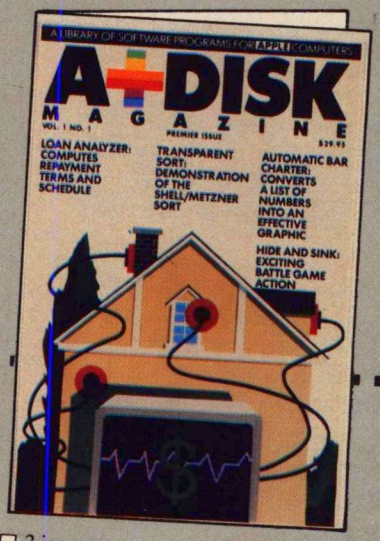

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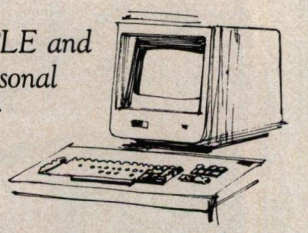

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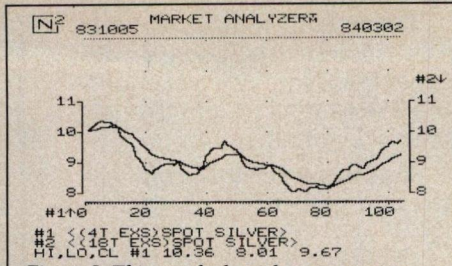

Figure 5: This graph shows how you can use the N-Squared Market Analyzer to evaluate moving-average crossover trading systems. This example shows the 4-day and the 18-day exponential moving averages of spot silver. Note the use of daily data.

prehensive. The program diskette even contains a demonstration program that lasts about 15 minutes and gives you a good idea of the program's operation and its capabilities.

Test Drive

As an example of how this program works, here's a description of how to construct the advance-decline line, which is simply the cumulative sum of the difference between advances and declines. From the displayed list of data files, select the one that contains the advances and declines. In this case it is MKT TRNDS. While the file is being loaded into memory, you'll see a display of all the data sets that file holds. From this display you select two sets of data,

The N-Squared Market Analyzer is a valuable analysis tool for anyone interested in the technical aspects of the markets.

Advances and Declines.

Next you go to the heart of this software and operate on the data sets. The Operations section will have room for three data sets, but you can load only the first two from the data files. With just four keystrokes, you can subtract the declines from the advances. Now set 1 is <ADVANCES(-)DECLINES>. With three more keystrokes, you can obtain a running sum of set 1, and there you are: the advance-decline line.

You can further operate on the line in any number of ways. Try taking a five-week arithmetic moving average of it. You'll need only four keystrokes. Now compare the advance-decline line to the *Standard & Poor's 500 Index*. First, move the data in set 1 to set 3.

Then go to the main menu to select a new data file, one that contains the S&P 500 Index. After you load the new file, select the S&P 500 Index for loading into sets 1 and 2. Now you have the S&P 500 Index in sets 1 and 2 and your five-week moving average of the advance-decline line in set 3. Now move sets 1 and 3 around with the Switch command so that set 1 will contain the indicator and set 2 will contain the index.

You can plot only the first two sets with the split-screen option. From the main menu, select Plot, and in a few

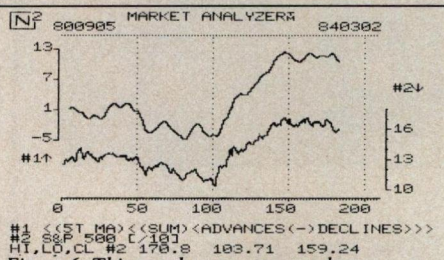

Figure 6: This graph compares an advance-decline line to the Standard & Poor's 500 Index.

seconds a chart similar to that in figure 6 will unfold. Now you can dump the graph to your printer or save it on a diskette with only one keystroke.

The graph is extremely informative. The description at the bottom shows the operations you went through to obtain the comparison.

You can now return to the Operations section and manipulate the data further or load new data for a different comparison.

Summing Up

There you have it. Simple, quick, straightforward data manipulation, limited only by your imagination. Does the software have any bad points? Yes, it does. You can become so involved in using it that the grass will not get cut.

The N-Squared Market Analyzer is a valuable analysis tool for anyone interested in the technical aspects of the markets—stocks, bonds, futures, or whatever. +

PRODUCT INFORMATION

N-Squared Market Analyzer
N-Squared Computing
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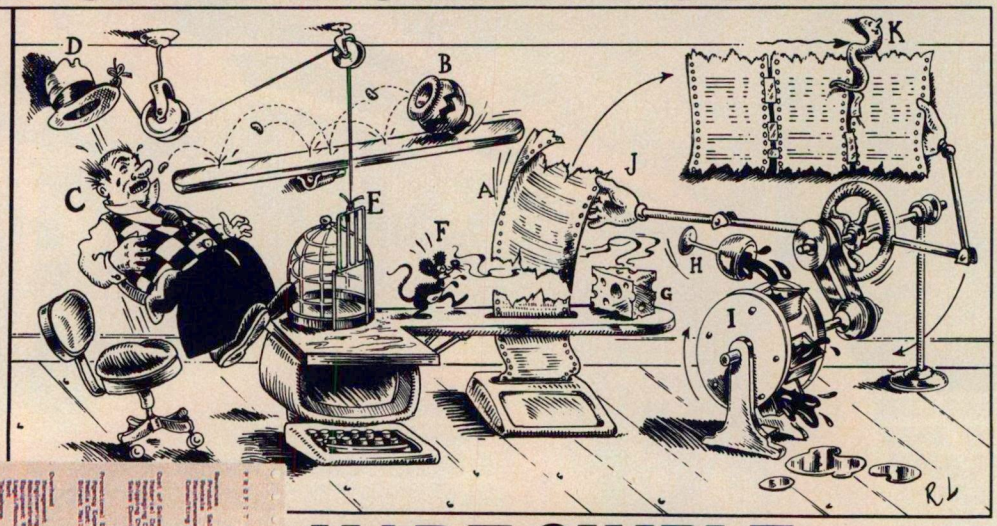
MOUSE, INSPIRED BY SCENT OF PERFECTLY AGED CAMEMBERT CHEESE, GNAWS THROUGH SPREADSHEET, ONLY TO DISCOVER HE HAS BEEN FOOLED BY AROMA OF OVER-RIPE GORGONZOLA (G).

IN A FIT OF PIQUE HE SPILLS VINTAGE WINE (H) INTO WATER-WHEEL (I) WHICH TURNS PULLEY THAT CAUSES GLOVE (J) TO GRASP SPREADSHEET AND MOVE IT TO TAPING AREA.

SHEET IS TAPED SECURELY IN PLACE BY TRAINED ADHESIVE TAPE WORM (K).



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programming contest

How to Get Your Own Listing

Starting this month, we will not be printing listings of winning programs in *A+*. Instead, we will give you several ways to obtain listings, including the ability to download the program directly into your computer via CompuServe.

Here are the ways you can obtain the listings of the winning software of the *A+* Program of the Month contest:

1. Download the program directly into your Apple from CompuServe. Log onto CompuServe (you must already be a member) and type GO PCS51, which will bring you to the Apple User's Group area. The computer will then automatically guide you through the system with a series of menus and help screens. If you have any questions, you can send a message directly to us via CompuServe's electronic-mail system. *A+*'s ID number is 72356,2673. If you want to contact CompuServe, its phone number is (800) 848-8199 (in Ohio, dial (614) 457-0802).

2. Watch *A+ Disk Magazine* for listings of our contest winners. Future issues of *A+ Disk Magazine* will have the winning program, ready to run, on the diskette.

3. Write to us for the listing. If you don't belong to CompuServe and don't get *A+ Disk Magazine*, then you can write to us, and we'll send you a copy of the listing. Be sure to state the name of the program, the month that it won, and include a self-addressed, stamped envelope.

▶ **CONTEST WINNER**

Dr. Kenneth Buchholz's program for students, businesspeople, and researchers

SPS: SIMPLE POPULATION STATISTICS

Congratulations to Dr. Kenneth Buchholz of Bordentown, New Jersey, who is August's Program of the Month contest winner. He will receive $500, and we'll enter him in our special $1000 grand-prize contest. This month's winning program, which calculates various statistics about one or two populations, is entitled SPS: Simple Population Statistics. Buchholz is an assistant professor of ecology and environmental sciences at Rutgers University and wrote this program for his own use, as well as for use by his colleagues and students.

Here are Buchholz's comments about the program:

I developed SPS: Simple Population Statistics for students, businesspeople, scientific researchers, and others who need to perform simple statistical analyses of one or two data sets (populations) but find that many commercially available statistical programs are unsuitable, because of prohibitive costs or complexity of program operation.

The SPS program is completely menu-driven and self-documented and allows you to determine simple statistical attributes (mean, variance, standard error, standard deviation, and coefficient of variation) for one or two populations simultaneously and, for two-population analyses, the comparative Student's T-Test statistic. In addition, SPS includes interactive data input, disk storage and retrieval, data review and editing, hard-copy output of data lists and statistics to a printer in slot 1 (if available), and access to an on-line documentation file that you expand with your personal notes on operation of the SPS program, data files, and the like. Program operation follows a logical order of analysis, data input (interactively or from a previously created SPS data file), review, editing (if necessary), and statistical analysis.

The SPS program consists of three primary modules (Single for single-population analyses, Dual for two-population analyses, and the user-expanded on-line documentation DOC file) and a greeting module (FORMATSELECT), which gives you access to the three primary modules when you boot the program. All program modules are written in Applesoft BASIC to allow easy customization (e.g., addition of a hi-res graphics module).

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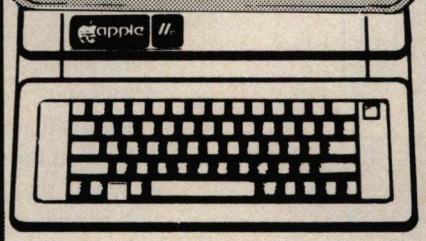

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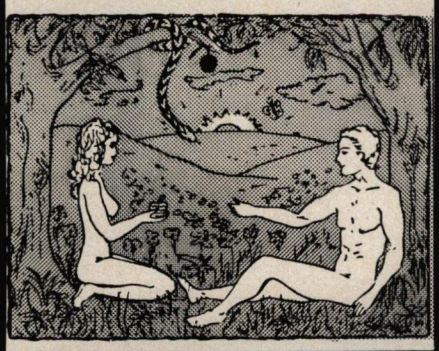

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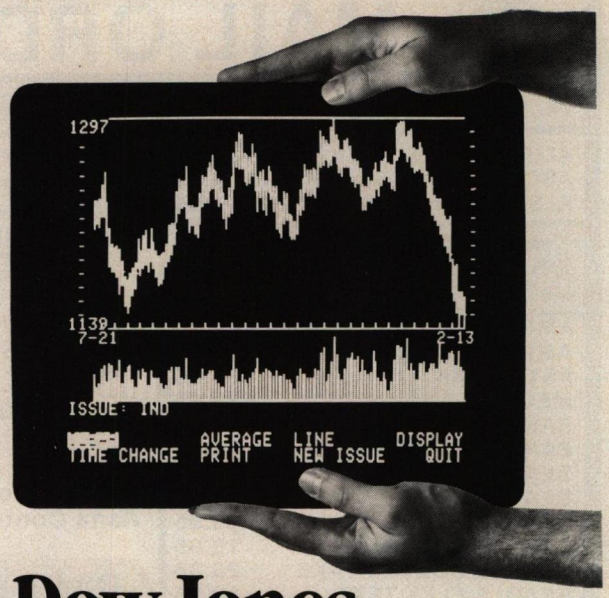

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▸ TUTORIAL/BY ROBERT COWART

HOW TO dBASE II

PART X

In a tutorial series on dBase II, a popular program for database management

Welcome to our ongoing series of tutorials on the increasingly popular microcomputer data-management tool dBASE II. If you have been following along through the last nine installments in *A+*, you should now be fairly adept in many of the rudimentary, as well as some of the more complex, techniques for creating databases, storing information in them, and keeping that information up to date. We've also covered most of the approaches for data retrieval, including the use of sorted and indexed databases, types of operators, memory variables, some functions, and commands that accomplish large-scale modifications of and interactions between existing data files.

This time, we'll learn to use the Total command to create new files consisting of subtotals based on existing files. But first, a few notes to newcomers.

Tutorial Conventions

These tutorials contain numerous examples. Sometimes you are asked to type in a command, and then dBASE II responds. Just to differentiate between what you do and what dBASE II responds with, the ones you type appear in lowercase letters. Uppercase works, too, so it doesn't really make a difference; it's just clearer this way. Some examples may specifically ask you to type in uppercase, but they always involve a series of words between quotation marks. The dBASE II responses are usually in uppercase letters. All screen interactions are listed in special type to distinguish them from the rest of the text. To make these sections more readable, carriage returns are implied rather than included here.

In the command-syntax examples, words between square brackets (e.g. [scope]) indicate an optional phrase or "argument."

In some of the examples, the command lines (the part you type) are too long to fit in one of our column lines. In these cases, you'll find a semicolon where the break occurs. Don't type this semicolon; just continue typing the command, and then press Return.

Total on . . . to . . .

If you use the Report command much, you are familiar with its subtotal capabilities. Another command, Total, stores the results of complicated subtotaling in a database file rather than just printing it on paper. It's a little tricky to use, though, so let's take a look at the full syntax first (see figure 1).

A little obscure for you? Me too. So let's take it one step at a time, using an example. First, create the following inventory-database structure and add the listed records:

```
STRUCTURE FOR FILE:  A:TOTLXMPL.DBF
```

```
NUMBER OF RECORDS:    00010
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD       NAME          TYPE      WIDTH   DEC
001       CATEGORY        C         010
002       QUANTITY        N         002
003       COST            N         006   002

. list
00001  RECEIVER            5          225.49
00002  RECEIVER            4          312.00
00003  RECEIVER           13           19.99
00004  RECEIVER           50           12.95
00005  SPEAKERS           30          199.00
00006  SPEAKERS            6          250.00
00007  TAPE DECK          10          125.65
00008  TAPE DECK           5          149.33
00009  TURN-TABLE          5           99.99
00010  TURN-TABLE          3          595.00
```

This material is a partial breakdown of items in an imaginary stereo shop. Actually, the full database has other fields for model numbers and the like, but we don't need them here. Now, let's assume that you would like a record of the total number of items in each category of products you have in stock (i.e., how many receivers, speakers, etc.), so you'll know which type of items to order. In other words, you want subtotals of the Category field. You can get by with less than the full command syntax:

```
TOTAL on CATEGORY to <filename>
```

The first trick is that you have to index or sort the source database on the key field, which, in this case, is Category. The purpose of this step is to group all of the similar items that the program will subtotal; otherwise dBASE would have to jump around in the database to figure out each subtotal. Actually, the list, as it appears above, is already sorted by category, but for illustration, go ahead and create an index:

```
. index on category to cat
. set index to cat
```

Now create the new database that will contain the totals and examine it:

```
. total on category to newfile
00004 RECORDS COPIED

. use newfile
. list
00001   RECEIVER          72      570.43
00002   SPEAKERS          36      449.00
00003   TAPE DECK         15      274.98
00004   TURN-TABLE         8      694.99
```

```
TOTAL ON <key> TO <database> [FIELDS <list>] [FOR   <exp>]
                                              [WHILE <exp>]
```

Figure 1: The full syntax of the Total Command

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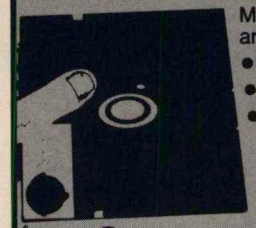

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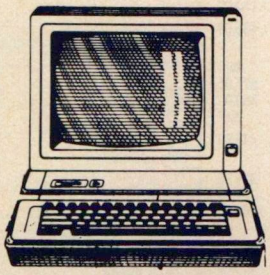

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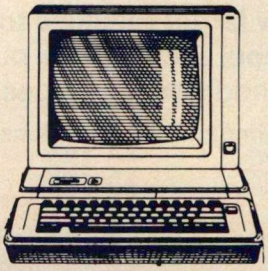

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Notice that the new file contains only one record per category, with, for example, the total number of receivers in the quantity column. A little fringe benefit here is that the price column was also totaled, even though we weren't interested in that figure. In fact, the program automatically totals any numerical fields, unless you take steps to prevent it. This point is important if the source database has numerous fields, some of which you prefer to ignore.

The Total command automatically copies the entire structure of the source file to the new (destination) file, unless the destination file already exists. If it does already exist, then totals will be calculated only on the fields in the file. The moral is to create the destination-file structure first with only the fields you need:

```
. use totlxmpl index cat
. copy structure to newfile field;
  category, quantity
. use newfile
. display structure

STRUCTURE FOR FILE:  A:NEWFILE .DBF
NUMBER OF RECORDS:   00000
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD    NAME            TYPE    WIDTH     DEC
001    CATEGORY          C       010
002    QUANTITY          N       002
```

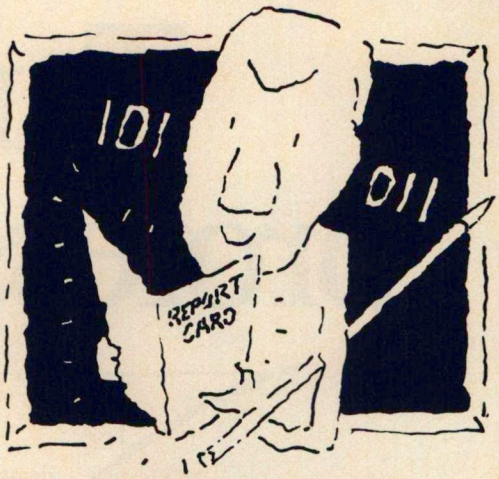
Now that we have only the two relevant fields in the destination database, we're ready to use Total again and take a look at the results.

```
. use totlxmpl index cat
. total on category to newfile
00004 RECORDS COPIED
. use newfile
. list
00001           RECEIVER        72
00002           SPEAKERS        36
00003           TAPE DECK       15
00004           TURN-TABLE       8
```

Finally! Exactly what you wanted. (Looks like you should order everything except receivers.) You may suspect that you could have arrived at this information by using the Fields phrase in the full syntax of the Total command. Well, almost. Stipulating fields that way still copies all of the structure to the new file but performs totals only on the listed field(s). With Fields you end up with more fields than you wanted, but at least dBASE won't calculate irrelevant subtotals. Let's try it!

```
. use totlxmpl index cat
. delete file newfile
. total on category to newfile fields;
  category, quantity
00004 RECORDS COPIED
. use newfile
. disp stru

STRUCTURE FOR FILE:  A:NEWFILE .DBF
NUMBER OF RECORDS:   00004
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
```

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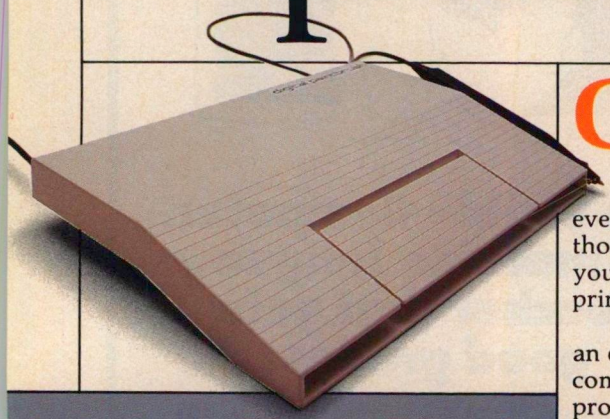

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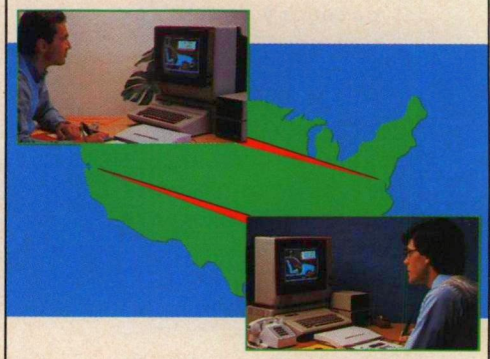

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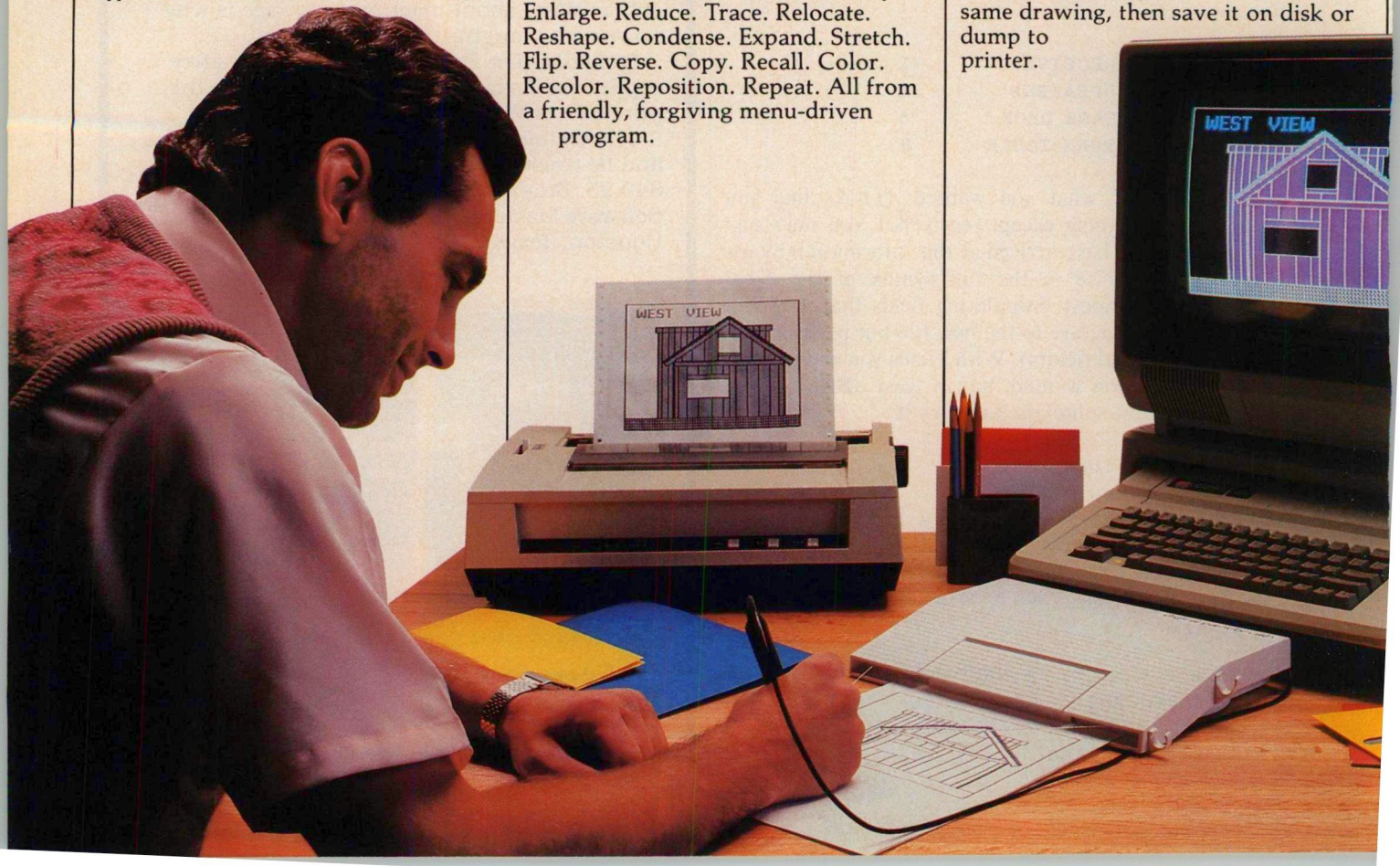

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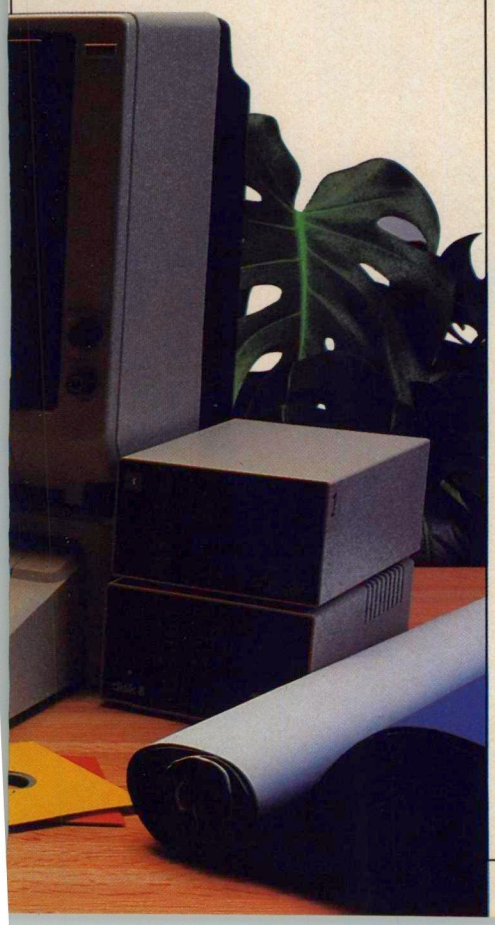

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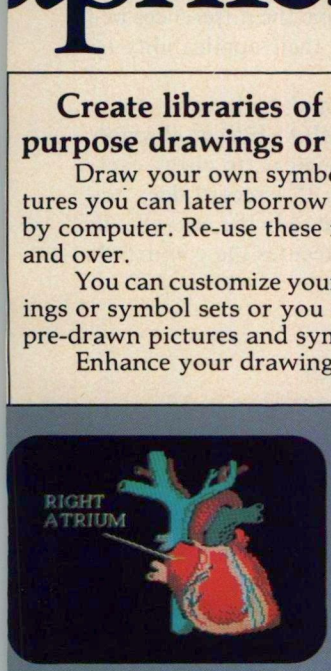

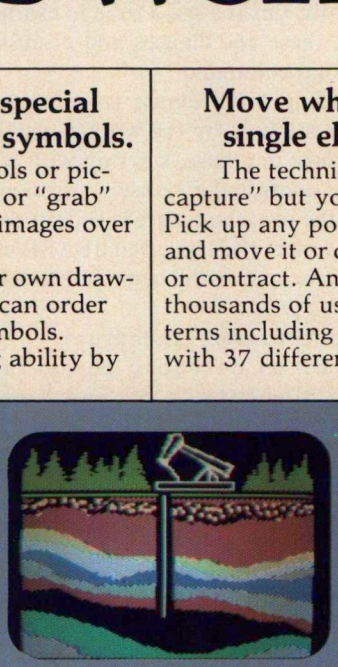

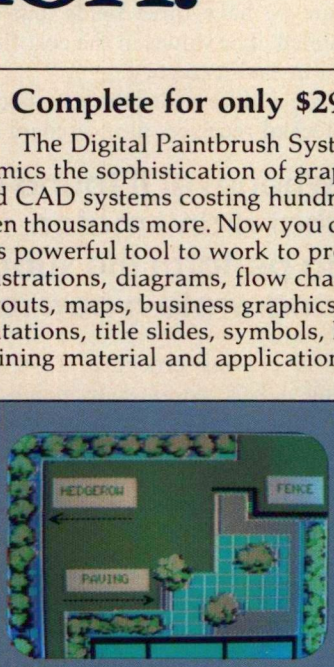

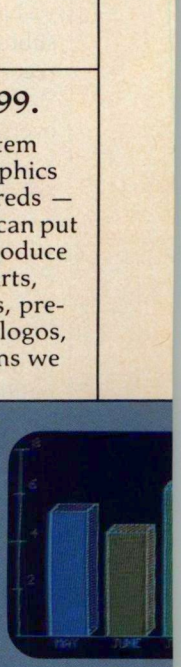

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```
FLD    NAME           TYPE    WIDTH  DEC
001    CATEGORY        C       010
002    QUANTITY        N       002
003    COST            N       006   002

  list
00001   RECEIVER      72        225.49
00002   SPEAKERS      36        199.00
00003   TAPE DECK     15        125.65
00004   TURN-TABLE     8         99.99
```

Now we have three fields, but only the quantity was subtotaled. The values in the cost field came from the first record in each category.

If you suddenly decide you should ditch some of your overstocked receivers at a discount and announce the sale

Whenever it found a record that didn't match, it went off to perform the subtotaling and wrote a new record.

in an advertising brochure, dBASE can even print your mailing labels from your point-of-sale database. But there's a snag. That database contains lots of duplicate customer names because you've entered each purchase (including customer name) into a new record. Searching out the duplicates and removing them manually would be tedious.

Surprise! The Total command can eliminate duplicates. If you think about it, only one record of each category was copied in the last examples. dBASE looked at the data in the first category field (RECEIVER) and compared it to the same field in subsequent records. Whenever it found a record that didn't match, it went off to perform the subtotaling and wrote a new record in the destination file. Could this elimination process work with nonnumerical fields, too? Let's try it, using the database in figure 2.

The second Sigmund Robinshki miraculously disappeared. Of course, the spellings and case (upper/lower) must be the same in both records for this trick to work.

For and While

OK, what about the For and While expressions in the full Total command syntax at the beginning of the article? Actually, this is a good time to examine the differences between these two clauses and discuss their applicability to the Total command.

Adding a For clause to a command (only some commands allow it, by the way) causes dBASE to go through the whole database, starting with record 1, to check each record against the clause's criterion. If a record does not meet the test, the program skips it and tests the next one. If it does meet the test, then dBASE executes the command. So, for example, this approach is legal:

```
. use totlxmpl index cat
. total on category to newfile;
  for quantity > 5 .and . quantity < 30

00003 RECORDS COPIED
. use newfile
. list
00001  RECEIVER      13        19.99
00002  SPEAKERS       6       250.00
00003  TAPE DECK     10       125.65
```

If you realize that you may be generally overstocked,

```
STRUCTURE FOR FILE:  A:XACTION.DBF
NUMBER OF RECORDS:   00006
DATE OF LAST UPDATE: 00/00/00
PRIMARY USE DATABASE
FLD             NAME          WIDTH     DEC
                TYPE
001       FIRST:NAME             C        010
002       LAST:NAME              C        020
003       COMPANY                C        025

 . index on last:name to lastname
 . set index to lastname
 . list
00004   ED      EYETORS     OPTICAL ILLUSIONS
00002   JUDY    LANGENDORF  GOSHEN WINGBOLT
00003   ELWOOD  RABBITT     ANIMAL PARADISE
00005   SIGMUND ROBINSHKI   PSYCHICS ANONYMOUS
00006   SIGMUND ROBINSHKI   PSYCHICS ANONYMOUS
00001   JIM     WAFER       TEST TUBES UNLIMITED
 . total on last:name to newfile2
00005 RECORDS COPIED
 . use newfile2
 . list
00004   ED      EYETORS     OPTICAL ILLUSIONS
00002   JUDY    LANGENDORF  GOSHEN WINGBOLT
00003   ELWOOD  RABBITT     ANIMAL PARADISE
00004   SIGMUND ROBINSHKI   PSYCHICS ANONYMOUS
00005   JIM     WAFER       TEST TUBES UNLIMITED
```

Figure 2: The Total command eliminates duplicate records.

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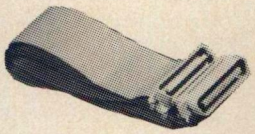

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IBM PC Parallel Printer Adapter Type
(CDB25 Male to Centronics Male)

Part No.	Length	Price
CDB25P-5-CEN36M	5'	$17.95
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Style J Male to Male
Style L Male to Female

We stock over 200 different cables. If you don't see what you need, please call.

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New!

• Plugs directly into Apple II or II+ motherboard with 16-pin ribbon cable connector • 26 special functions • Size: 14"L x 5½"W x 1½"H • Color (keycaps): white/grey • Weight: 2 lbs.

KB-A68. . . . . $99.95

80-Column plus 64K RAM for your APPLE *IIe**

Now you can double the memory capacity and get an 80-column display format for your APPLE *IIe** computer at an affordable price. Just plug the JE864 card into your APPLE* and expand your display to 80 characters per line. Perfect for word processing. The JE864 also features 64K bytes of additional memory to allow programming not possible with standard APPLE *IIe** computers. Complete documentation included.

Board: High density board design squeezes 64K bytes of RAM onto a 2½" x 4½" board • Fully tested to assure proper operation.

Uses: Word processing – displays 1000 more characters per screen • Extra memory allows running of extremely large programs • Ultra High Resolution Graphics capability.

JE864. . . $124.95 ~~$149.95~~

Numeric/Auxiliary Keypad for your APPLE *IIe**

The JE614 is a newly introduced numeric/auxiliary keypad for the APPLE *IIe.** It offers the flexibility of a 10-key pad and the convenience of 23 directly accessible functions. Screen manipulating functions make word processing a snap and cursor controls make the keypad ideal for VisiCalc** users. The JE614 Keypad is housed in a durable metal enclosure and is color-coordinated with your APPLE *IIe* computer. Operation of the keypad can begin within minutes from unpacking. Special functions include: Home, Clear, Clear to End of Screen, Scroll-Up, Scroll-Down, Tab, Delete, Left, Right, Up and Down. Each key has auto-repeat. Size: 5⅞" L x 4-3/16" W x 1¼" to 2½" Slope.

JE614 . . . . . $89.95

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**VisiCalc is a registered trademark of Visi Corp. Inc.

CIRCLE 276 ON READER SERVICE CARD

INCREDIBLY SPREADABLE.

Do spreadsheets faster and easier with complete cursor control on the programmable IIe Tender Keypad.

The Apple IIe* is a nice computer. Until you try to do a ledger, a VisiCalc** spreadsheet...or for that matter, any program that uses numbers. It could take days.

Cursors!

What you need is the IIe Tender. It's the Apple* keypad that gives you cursor control in all directions, as well as four programmable keys which can be permanently defined to any frequently-used key. And redefined at will.

At your fingertips.

You also get the four mathematical functions, a decimal point, comma, space bar and delete key. Plus, the IIe Tender is human engineered to provide you with a sure touch and less user fatigue, and comes standard with Coupler-Calc software to turn it into a fixed or floating-point calculator. It's even color-coordinated to match your Apple.

You can install the IIe Tender–without taking up an expansion slot–in about five minutes. And our interface allows disconnection in seconds without getting inside.

Try one.

Try the incredibly spreadable IIe Tender at your local Apple Dealer today. Or write or call us for more information.

TRACK HOUSE

161 S. Viking Ave.
Brea, California 92621
Telephone:
(714) 671-3937

Dealer inquiries invited.

Standard, non-programmable models are also available for both the Apple IIe and Apple II+. Ask your dealer for details.*

**Apple IIe, Apple and Apple II+ are registered trademarks of Apple Computers, Inc.*
***VisiCalc is a registered trademark of VisiCorp.*

CIRCLE 255 ON READER SERVICE CARD

you may want a subtotal listing of categories in which particular models have more than $1000 tied up in inventory.

```
. total on category to newfile;
  for quantity * cost >1000
00004 RECORDS COPIED
 . use newfile
 . list
00001  RECEIVER       9        537.49
00002  SPEAKERS      36        449.00
00003  TAPE DECK     10        125.65
00004  TURN-TABLE     3        595.00
```

(just to verify . . .)

```
. list quantity * cost

00001   4837.41
00002  16164.00
00003   1256.50
00004   1785.00
```

The While clause does not rewind the database to record 1, but starts wherever the pointer happens to be. Also, it gives up checking records as soon as one fails the test the command stipulates. What's more, the command attached to the While won't execute at all unless the current record meets the test. And incidentally, the For and While clauses are mutually exclusive—you can use only one of them in a given command. Here's an example of how the While clause should work with Total:

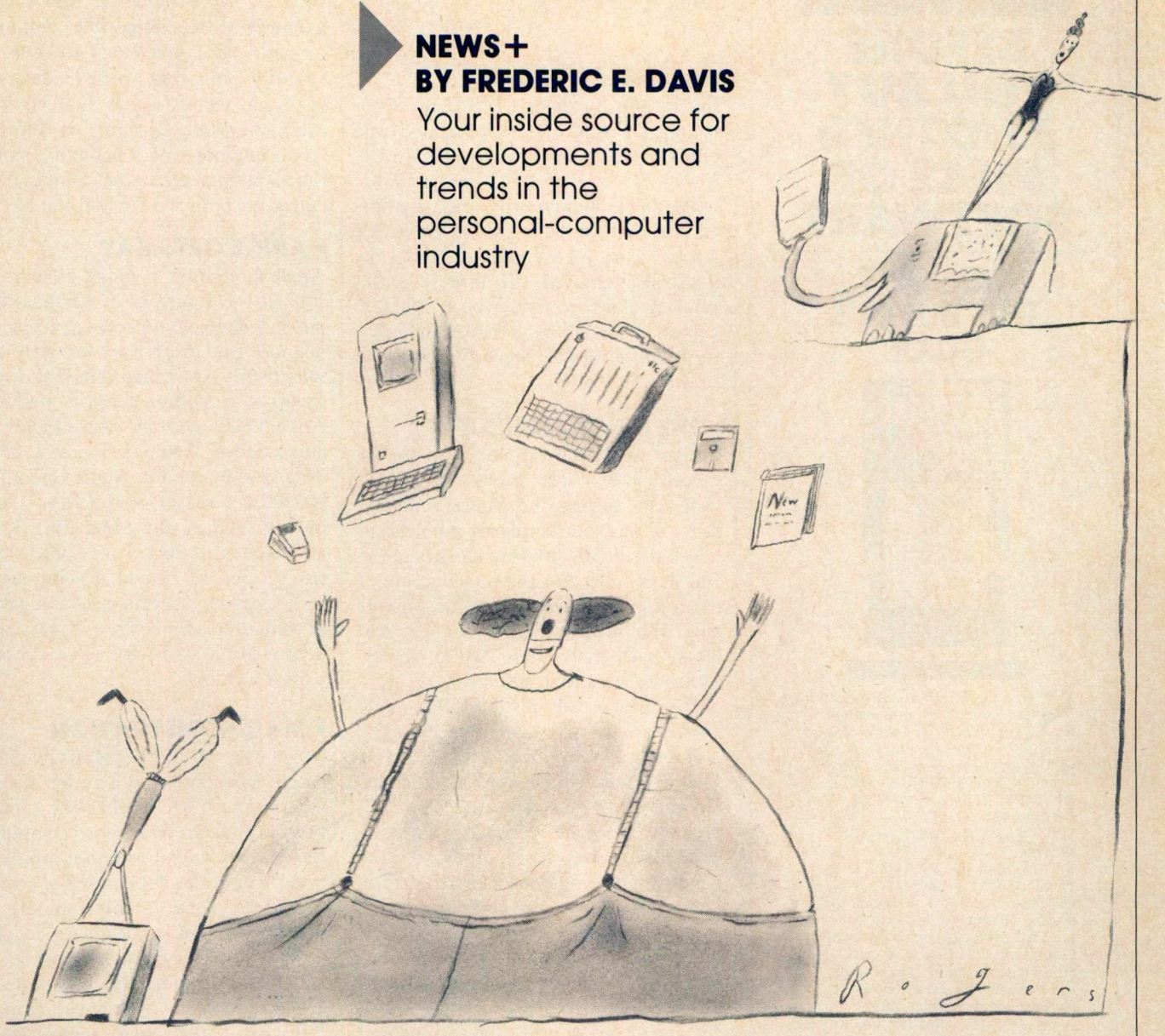
```
 . use totlxmpl index cat
 . list
00001   RECEIVER       5        225.49
00002   RECEIVER       4        312.00
00003   RECEIVER      13         19.99
00004   RECEIVER      50         12.95
00005   SPEAKERS      30        199.00
00006   SPEAKERS       6        250.00
00007   TAPE DECK     10        125.65
00008   TAPE DECK      5        149.33
00009   TURN-TABLE     5         99.99
00010   TURN-TABLE     3        595.00

 . go top
 . total on category to newfile;
   while quantity < 13
00004 RECORDS COPIED
 . use newfile
 . list
00001   RECEIVER      72        570.43
00002   SPEAKERS      36        449.00
00003   TAPE DECK     15        274.98
00004   TURN-TABLE     8        694.99
```

What? It didn't work, did it? The process should have stopped when record 3 was reached. Instead we ended up with the same data in newfile that we saw earlier, without any While clause. Well, welcome to the world of bug watching, or entomology, as it's called in academic circles. We seem to have caught a live one this time. So while you're experimenting, I'll just ring up the folks at Ashton-Tate to see what the scoop on this one is. (Fill you in next time!) +

dBASE II is a trademark of Ashton-Tate.

NEWS+
BY FREDERIC E. DAVIS

Your inside source for developments and trends in the personal-computer industry



APPLE II FOREVER

"Apple II Forever" was the theme of the $2 million extravaganza that Apple Computer held on April 24 in San Francisco's Moscone Center for its dealers to announce the introduction of the IIc computer. The IIc introduction was an event to be remembered and has brought computer introductions to new heights.

The event started with a display of showmanship that P. T. Barnum would have been proud of. A multimedia audiovisual display dominated the stage. Apple images flashed by at a rapid pace, accompanied by the theme from *Flashdance* with the lyrics changed to "We Are Apple." Next, the two founders of Apple, Steve Jobs and Steve Wozniak, did their shtick. Jobs gloated over the "insanely great" success of the Macintosh, and Wozniak told slightly off-color computer jokes. Then John Sculley, Apple president and master showman, took center stage and started to build up the audience's excitement about the new product, without letting anyone know what it looked like yet.

When the anticipation of the 4000 Apple dealers, developers, and members of the press had built to a crescendo, Sculley grabbed a IIc from underneath the podium and waved the tiny computer over his head. "Can't see it very well?" he teased, as everyone in the room strained to see the new Apple. "Wouldn't it be nicer if there were a few more to look at?" Suddenly a spotlight came on in the back of the auditorium, and everyone could see a group of about 40 Apple employees waving IIc's over their heads. Then in the next breath, Sculley said, "It's still hard to see them—maybe it would be better if there were hundreds of them." Responding to the cue, hundreds of people in the audience whipped out a IIc from beneath their seat.

The impact was immediate. The members of the audience instantly had their hands on a IIc and were passing them around. Sculley continued, "We are going to let every dealer take home a IIc today! And you can order ten units for immediate delivery; the product is ready to be shipped *now*!" To drive home the point, the stage curtain was pulled back to reveal boxes of IIc's stacked floor to ceiling. Sculley had really proved himself as the three-ring-circus master of computers.

The dealers were ecstatic and placed orders for 50,000 IIc's that day. That's the fastest sales rate for any computer after its introduction. By comparison, it took Apple two years to sell that many Apple II's, it took IBM almost a year to sell that many PC's, and it took Apple

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about 70 days to sell that many Macintoshes.

▸ IIc INSTANT BOOK

Simon and Schuster's Electronic Publishing Division didn't waste any time cranking out a book on the Apple IIc. *Going Places with the New Apple IIc* by Danny Goodman was written, printed, and distributed in just seven weeks, a new record for a computer book. The book also enjoyed the largest initial printing of any computer book: 200,000 copies. The 251-page paperback features a foreword by Steve Wozniak and sells for $3.95.

▸ THE MAC'S 100 DAYS

Congratulations to Apple Computer for exceeding its expectations for Macintosh sales during the Mac's first 100 days in the marketplace. Apple had hoped to sell 50,000 Macintoshes in the 100 days following the introduction of the computer. Now that all the figures have been tallied, it turns out that Apple shipped more than 70,000 Macintoshes in those first 100 days.

The Macintosh has definitely made an impact on the computer industry. Not only have national retail chains such as Sears, Businessland, and the Genra Group picked up the Apple 32 product line, but software and hardware developers are jumping on the bandwagon at an ever-increasing rate. During the Mac's first 100 days, Apple received more than 5000 inquiries and more than 1500 applications from companies who wanted to join the Macintosh Development Team. Apple is still getting 25 to 30 new applications and more than 100 calls a day requesting application forms. We can expect new Macintosh products to start arriving in an avalanche any time now.

▸ RGB FOR THE IIc

Video-7, Inc., of Saratoga, California, has just introduced an RGB interface for the Apple IIc that is absolutely packed with features. The new interface features several display modes such as a text mode (40 or 80 columns with no color tinges or fuzziness); a 140 × 192-pixel mode with 16 colors; a double-hi-res mode with 560 × 192 pixels in two colors; and a mix mode, which enables you to mix areas of 16-color 140 × 192 and 2-color 560 × 192 on the screen.

Video-7 offers a similar board for the Apple IIe. The company also sells a special interface called the Mappler that converts Apple RGB signals to IBM PC RGB signals so that you can use an IBM PC-compatible color monitor with your Apple IIe or IIc. One reason why Video-7 is at the leading edge of Apple technology is that company president Walt Broedner is a former Apple engineer; Walt had a big hand in the development of the computer circuitry for both the IIe and the IIc.

▸ APPLE GETS KAY

Apple Computer is doing all it can to stay in the forefront of personal-computer technology. Recently Apple announced that Alan Kay, formerly chief scientist at Atari, had joined the select group of computer geniuses known as Apple Fellows. Other Apple Fellows include Steve Wozniak (creator of the original Apple I and Apple II) and Bill Atkinson (creator of the Lisa, Quickdraw Graphics, and Macpaint). Kay is an excellent addition to Apple's brain trust, since he helped develop significant research projects involving personal computers, windows, and mice while he was at Xerox PARC (Palo Alto Research Center).

▸ MAC REGISTRATION

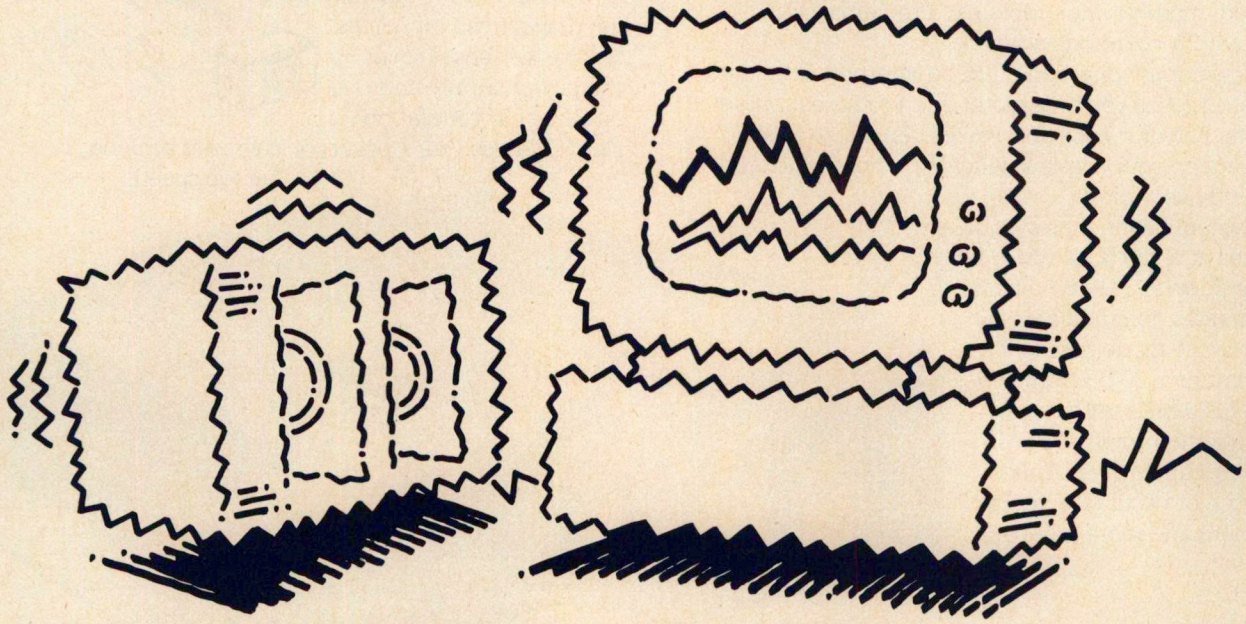
Mike Murray of the Mac division at Apple has confirmed a rather disturbing rumor. It seems that the registration card for the Macintosh computer is the *MacWorld* subscription-offer card, even though the publication is not connected to Apple. Unfortunately, the *MacWorld* card is not identified as the official Apple registration card.

When this subject came up at a recent Mac Users' Group meeting in San Francisco, there was some concern about this cozy relation between Apple and *MacWorld*. One Mac owner responded, "I was already subscribing to *MacWorld* when I bought my Macintosh. I just threw the card away, since I had no idea it was my official registration card." Other folks, who didn't want to subscribe to *MacWorld*, also expressed dismay, saying that Apple should have identified the registration card more clearly.

▸ GAMES FROM LUCASFILM

Lucasfilm Ltd. of Marin County, California, is best known as the creator of the *Star Wars* series and *Raiders of the Lost Ark*. Now Lucasfilm's new computer division has teamed up with Atari to market a new series of computer "video games." Lucasfilm will create all the games, and Atari will market them for the Apples under its Atarisoft label.

ELECTRICAL SURGES AND SPIKES CAN BE A REAL SHOCK TO YOUR SYSTEM.



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Surges and spikes can wipe out hours of data entry. Damage micro circuitry. And drive you crazy. All in a micro-second.

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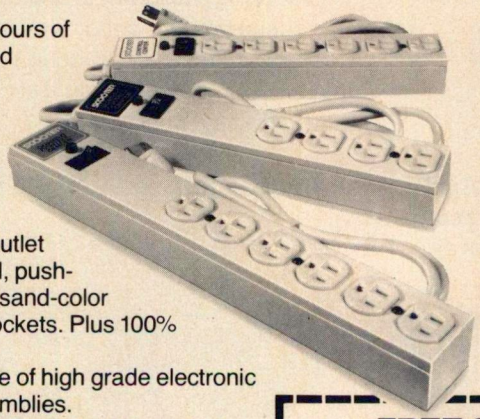

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Featuring 6 protected outlets, normal and common mode improved surge protection, surge failure indicator light and full 1-year warranty. **$49.95**

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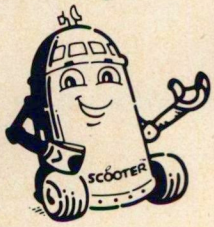

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AP-0884

CIRCLE 173 ON READER SERVICE CARD

What made over 100,000 Apple II owners fall in love with System Saver?

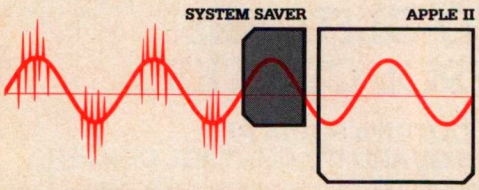
It's the most versatile, most convenient, most useful peripheral ever made for the Apple.®

System Saver® filters out damaging AC line noise and power surges.

70-90% of all microcomputer malfunctions can be traced to power line problems.* Problems your System Saver guards against.

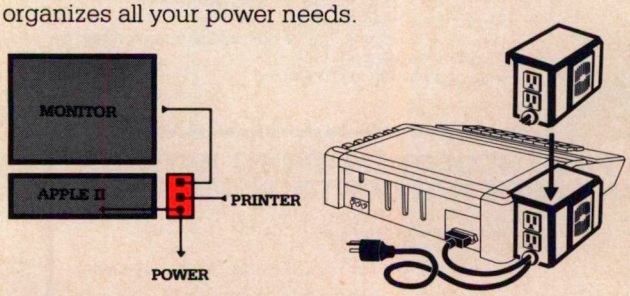
Power line noise can often be interpreted as data. This confuses your computer and produces system errors. Power surges and spikes can cause severe damage to your Apple's delicate circuitry and lead to costly servicing.

System Saver clips surges and spikes at a 130 Volts RMS/175 Volts dc level. A PI type filter attenuates common and transverse mode noise by a minimum of 30 dB from 600 kHz to 20 mHz with a maximum attenuation of 50 dB. You end up with an Apple that's more accurate, more efficient and more reliable.



System Saver makes your Apple more convenient to use.

No more reaching around to the back of your Apple to turn it on. No more fumbling for outlets and cords to plug in your monitor and printer. System Saver organizes all your power needs.

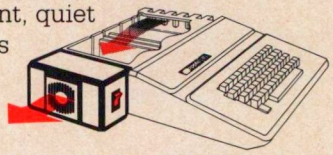


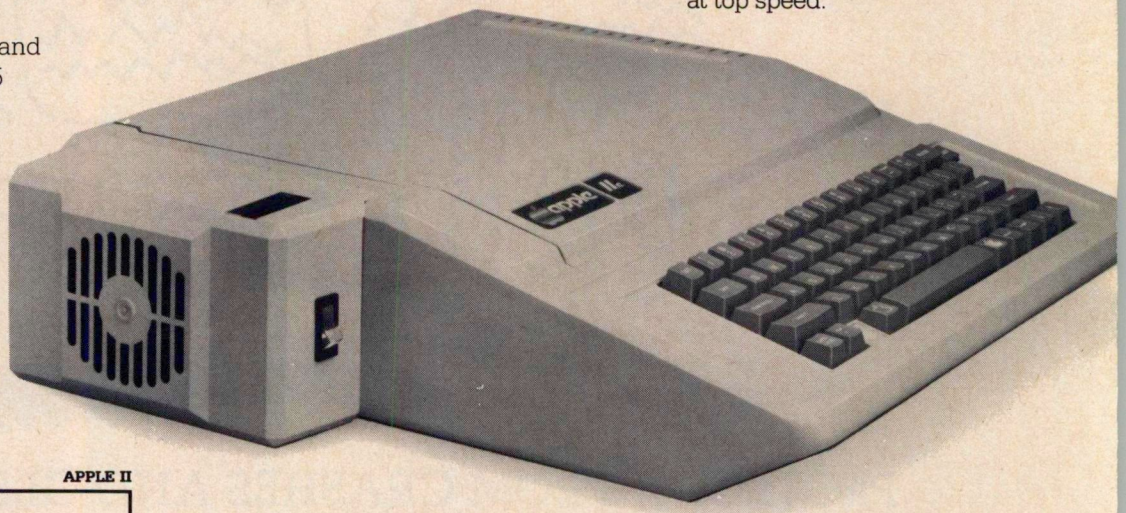
It functions as a multi-outlet power strip with two switched outlets. Plus System Saver offers the ultimate convenience; a front mounted power switch for fingertip control of your entire system.

System Saver lets your Apple keep its cool.

Today's advanced peripheral cards generate heat. In addition, the cards block any natural air flow through the Apple IIe creating high temperature conditions that shorten the life of the Apple and peripheral cards.

System Saver's efficient, quiet fan draws fresh air across the mother board, over the power supply and out the side ventilation slots. It leaves your Apple cool, calm and running at top speed.





So if you want to keep damaging heat, line noise and power surges out of your system for good, pick up the only peripheral that's in use every second your computer is in use. The System Saver. You'll soon come to think of it as the piece Apple forgot.

Compatible with Apple stand

$89.95 at Apple dealers everywhere.

KENSINGTON MICROWARE

CIRCLE 134 ON READER SERVICE CARD

251 Park Avenue South, New York, NY 10010
(212) 475-5200 Telex: 467383 KML NY

*PC Magazine: March 1983.

System Saver is UL Listed. System Saver's surge suppression circuitry conforms to IEEE specification 507 1980, Category A. Available in 220/240 Volts, 50/60 Hz.

System Saver is a registered trademark of Kensington Microware Ltd.
© 1984 Kensington Microware Ltd. System Saver is patent pending.

Lucasfilm hopes to bring the same level of craftsmanship that distinguishes its motion-picture special effects into the games. The first two games in the series are Rescue on Fractalus and Ballblazer. Rescue on Fractalus uses the sophisticated mathematical principle of fractals (a way of creating randomness in geometry) to create a continuously changing landscape. The game is sort of a cross between Flight Simulator and Choplifter, with elements of Star Wars. Ballblazer is a futuristic version of lacrosse played by spaceships on a giant chessboard. The games also feature interesting computer-generated music and sound effects. Atari promises that these games will be ready this fall, in time for Christmas. The creative genius of Lucasfilm may breathe new life into the ailing Atari software line.

▶ MAGIC OFFICE SYSTEM

Artsci, of North Hollywood, California, is offering a new integrated software system for the Apple IIe and IIc. Called the Magic Office System, the package is Artsci's answer to AppleWorks from Apple. The Magic Office System uses icons to represent file drawers, folders, stationery pads, and documents. The program includes a word processor (a greatly enhanced version of Magic Window II), a spelling checker, a spreadsheet (with support for up to 512K RAM), and a business-graphics package for creating charts and graphs.

▶ HOORAY FOR *A+*!

Excuse us for tooting our own horn, but . . . *A+* has won the Western Publications Association's prestigious "Maggie" award for Best New Publication of 1983 in the consumer-magazine category (as distinguished from the trade-magazine category). Our editor, Maggie Canon, picked up the award this past May at the organization's 27th annual awards ceremony in Los Angeles. It's sort of like the "Oscar" of the magazine industry, and we're all proud that *A+* came out on top. The Maggie awards are for all magazines, not just computer magazines. In fact, *A+* is the first computer magazine to win in the consumer category. As you may know, *A+* published its first issue in November 1983. At that time, we had an initial subscriber base of 60,000. Now, thanks to you folks out there, our circulation has zoomed to around 150,000 and is still growing steadily. ✚

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HARDWARE FOR APPLE	LIST PRICE	OUR PRICE
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High Quality Joystick w/Fire Button for II+	49	29
Switching Power Supply	110	64
Computer Case Similar to II+	149	59
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ADVANCED LOGIC SYSTEMS		
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Gold Card CP/M 64K	495	326
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Mach II Joystick for II+	39.95	35
Mach III w/Fire Button for II+	49.95	42
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64K Ram Card	199	152
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Magnum-80 80 Column Card	199	159
Dumpling Interface w/16K Buffer	215	159
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AP-SI0	$ 129.50	$ 95
64K Ram Card +80 Cols.	289	149
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Grappler +	175	115
Buffered Grappler + (w/16K of buffer)	239	169
Bufferboard	175	139
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Appli-Card 6MHz/64K Memory	375	275
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16K Microbuffer II	199	149
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64K Ram + 80 Cols.	249	189
128K + 80 Cols.	399	299
TRACK HOUSE		
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PC 8023	645	369
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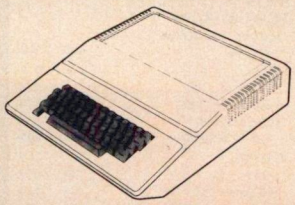

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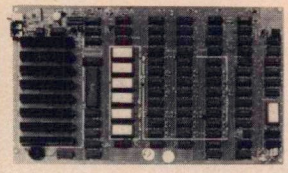

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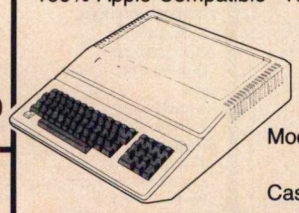

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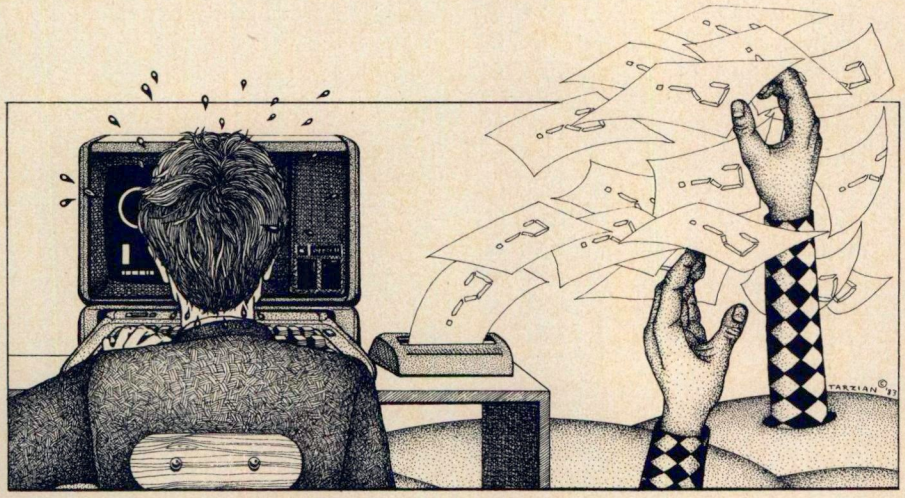
RESCUE SQUAD/BY KEN BOOROM

This month, Rescue Squad answers the question we receive most often: How can you get special printer features with Apple Writer?



CONTROL CODES AND APPLE WRITER

Q: Is there a convenient way to use printer-control codes (special printer features) with Apple Writer II, Apple Writer IIe, and Apple Writer III?

A: *Many people seem confused about whether Apple Writer can use printer features such as underlines, superscripts, subscripts, and boldface type. Apple Writer is a capable program that can produce excellent-quality printed documents by using all of your printer's built-in features. Please note that your printer must have these features built in. For example, some printers are not able to change such options as Horizontal Motion Index (pitch) and line feeding (superscript and subscript).*

The most convenient way to use printer codes is to sit down and create an Apple Writer glossary file. This file is the key to configuring your version of Apple Writer to your specific printer. By typing a Control-G and then another preassigned key, you can quickly recall all of your printer's functions, without going through a massive search for the exact sequence of operating codes.

To complete this task, you should turn your printer's manual to the page or table that lists the printer's operating codes; you also need the storage disk on which you keep your Apple Writer text files. If your printer does not have an operating-code table, see your dealer, call the printer manufacturer, or perhaps use the guideline example below. Note that this example is for one printer only, and you have to modify it to make it work with other printers. The printer in this example is a Diablo 630, an industry-standard daisy-wheel printer whose operating codes should be similar to those of most dot-matrix and daisy-wheel printers.

Let's get started. Boot whichever version of Apple Writer you have and press Return to get to the editor. Clear out your computer's memory by typing a Control-N and then answering (Y)es to the prompt. Next, type a Control-G, which will result in a prompt at the bottom of the screen asking you if you want to (?) define a new glossary item or (*) purge the glossary file currently in memory. Since you have cleared only your text page, it is a good habit to purge your glossary file before starting. Type a Control-G once again. Now you are ready to start defining your glossary file, so press ?.

Let's start with a simple definition. The glossary file will enable you to enter control codes directly into your document by defining glossary key combinations as the control codes that let you perform a specified task. In this example, the special print features are underline, superscript, subscript, proportional spacing, bold print (double-strike), shadow print (dark, thick letters), and pitch. Before entering definitions, we need to map out the features we want and the key to which we will assign that function. You can use the table on the following page as a reference guide. The choice of assigned keys should help you remember which glossary key does what.

Apple Writer is a capable program that can produce excellent-quality printed documents by using all of your printer's built-in features.

To start entering your key assignments, just follow this pattern. First type the letter you wish to assign. Follow it with a Control-V (to tell your printer to accept an operating code). Then type in the operating code from your table, followed by another Control-V to end the code sequence. Press Return, and you have finished your first definition. As you enter your definitions, a listing of them will appear whenever you type ? after a Control-G.

When you have completed your operating-code definitions, you are ready to save the glossary file permanently

on disk. If you are using Apple Writer II, save the file with the normal Control-S.

Name your file something like Diablo or Epson so you'll remember what the name of the file is that you have to load when you need these features. If you are using Apple Writer IIe, type a Control-Q and pick option F to save your file. To load your file from the old Apple Writer II, use the Control-Q option 5 sequence, and for the newer Apple Writer IIe, use the Control-Q option E sequence.

A note about Apple Writer II vs. Apple Writer IIe: These two programs work best in the machine they were written for.

To use the glossary file during text editing, type a Control-G and then the key that you have assigned to perform your desired task. If you can tackle this use of the glossary file, you will find that Apple Writer and printer-control codes will become as easy to use as features in much more expensive word processors.

A note about Apple Writer II vs. Apple Writer IIe: These two programs work best in the machine they were written for. Apple Writer II requires an Apple II or II Plus and an appropriate 80-column card in slot 3, and Apple Writer IIe requires an Apple IIe and an Apple-type 80-column card in the computer's special auxiliary slot. Any cross-arrangement of software and systems will prevent you from using all of the software's features. ✚

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002.

▶ PRINTER FEATURES

Feature	Operating Code	Assigned Key
Underline ON	ESC E	L (for line)
Underline OFF	ESC R	l (the letter *l*)
Superscript ON	ESC D	U (for up)
Superscript OFF	ESC U	u
Subscript ON	ESC U	D (for down)
Subscript OFF	ESC D	d
Proportional ON	ESC P	P (for proportion)
Proportional OFF	ESC Q	p
Bold print ON	ESC O	B (for bold)
Bold print OFF	ESC &	b
Shadow print ON	ESC W	S (for shadow)
Shadow print OFF	ESC &	s
10 pitch	ESC CNTRL-_ CNTRL-J	1 (the number *1*—for larger pitch)
12 pitch	ESC CNTRL-_ CNTRL-L	2 (for smaller pitch)

Table 1: Reference guide for defining printer features

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TRS-80 is a registered trademark of the Radio Shack Division of Tandy Corp.

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HARDWARE

McMill

McMill, a 68000 coprocessor card that uses Motorola's 68008 processor, is now available in a package that includes hardware, documentation, schematic diagrams, and FIG-Forth software. Optional software includes a 68000 cross assembler from SC Software and an enhanced screen editor. *(List Price: $229; with assembler software, $299)*
Requires: Apple II, II Plus, or IIe
Stellation Two
P.O. Box 2342
Santa Barbara, CA 93120
(805) 966-1140
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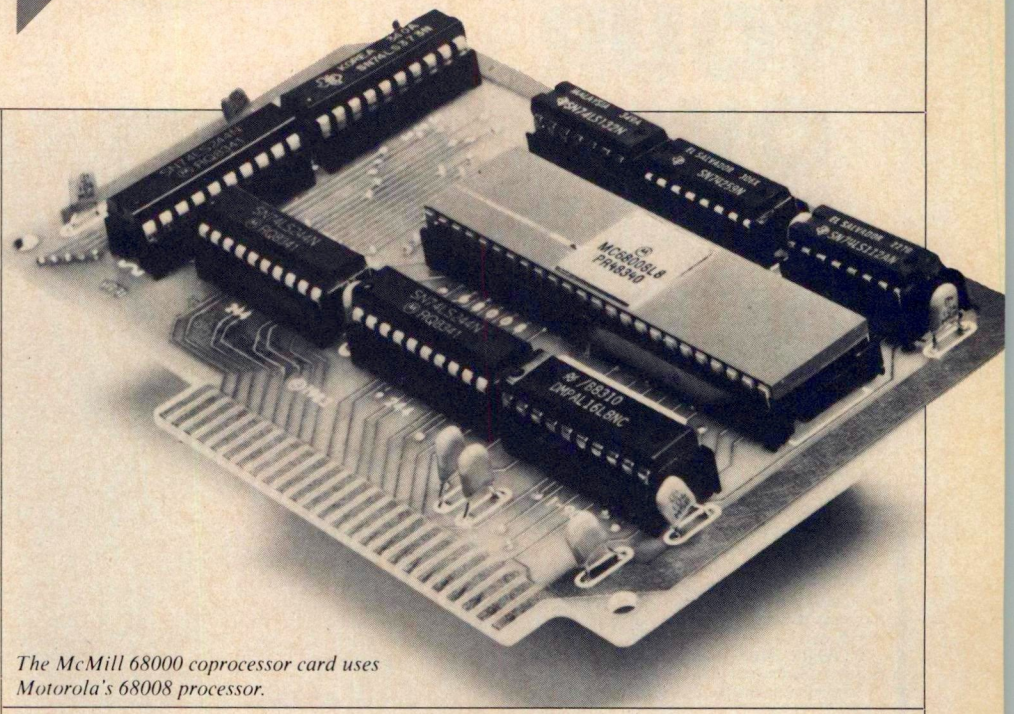

The McMill 68000 coprocessor card uses Motorola's 68008 processor.

Sprite Peripheral Boards

Several plug-in boards that enable you to create your own 3-D animated games or educational programs are now available. The boards allow you to create and program up to 32 animated objects (sprites) in 16 colors.

The SuperSprite board can present Apple background graphics, animated sprite graphics, sound effects, and synthesized speech simultaneously on your computer screen. SuperSprite is offered with software utilities that include Amperspite, a programming language.

Two derivatives of SuperSprite are available as separate boards. Sprite I comes with software that allows you to define, assemble, and move sprites to create fast-action programs. Sprite II also includes a sound generator, a speaker, and software that lets you program realistic sound effects and synchronize them to sprite action.

The VideoSprite graphics board allows a composite overlay of two video signals and is designed for applications such as subtitling and cartoon creation. The board allows you to introduce animated graphics and text to existing video programming, but it only works with color composite-video input that is close to NTSC standard. *(List Price: $395, SuperSprite; $149, Sprite I; $249, Sprite II; $795, VideoSprite*
Requires: Apple II, II Plus, or IIe
Synetix, Inc.
10635 N. E. 38th Place
Kirkland, WA 98033
(206) 881-8440
CIRCLE 511 ON READER SERVICE CARD

The PC-800/Apple multichannel counter

PC-800/Apple Event Counter

The PC-800/Apple multichannel counter is available in 8-channel multiples and can count to five decades at speeds up to 1 MHz. Inputs are sensitive to TTL levels and contact or transistor closures. The counter comes with software that lets you select intervals, read the contents of each counter, reset the counter to zero, and print results and store them on disk. A supplied I/O card provides communication between your computer and the counter. *(List Price: $1499, 8-channel; $2499, 16-channel)*
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Columbus, OH 43204
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CIRCLE 512 ON READER SERVICE CARD

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Texprint has upgraded its Print-It! Model 2 Apple printer-interface card so that it now contains both a serial and a parallel interface. The card can work with more than 30 models of printers, and it has 64K ROM, 202 graphics modes, 25 text modes, and 9 format modes. It can handle 40- or 80-column text, color, and graphics of varying resolutions. *(List Price: $149)*
Requires: Apple II, II Plus, or IIe
Texprint, Inc.
8 Blanchard Road
Burlington, MA 01803
(617) 273-3384; (800) 255-1510
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HARDWARE ACCESSORIES

Discwasher Products for Apple IIc

Discwasher has introduced an easy-to-install serial-to-parallel printer port adapter that permits owners of the Apple IIc to convert the IIc's serial printer port to a parallel port.

The company has also introduced a version of its Calling Four Game Port Expander for the Apple IIc and IIe computers. Calling Four II uses a nine-pin controller port and gives you access to any of four controllers—mice, joysticks, paddles, or graphics tablets, for example—with the touch of a button. A row of LEDs on the top of the unit indicates which port is active.

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case with a built-in rechargeable power system that can run the Apple IIc for three to five hours before you need to recharge. The Cari gives you a powered portable work station that weighs about 20 pounds when it holds the IIc and all peripherals and supplies you need. *(List Price: $129.95, serial-to-parallel printer port adapter; $79.95, Calling Four II; $249.95, The Cari)*

Requires: Apple IIc or IIe (Calling Four II only)

Discwasher
1407 North Providence Road
P.O. Box 6021
Columbia, MO 65205
(314) 449-0941

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Technalock is a security device that is designed to deter theft of personal computers, video equipment, and other small-business machines. The package consists of two mounting plates, a surface cleaner, one 2½-inch vinyl-coated steel cable, and one resettable combination lock. An expansion set that contains extra mounting plates is also available. *(List Price: $24.95; $14.95, Expansion Set)*

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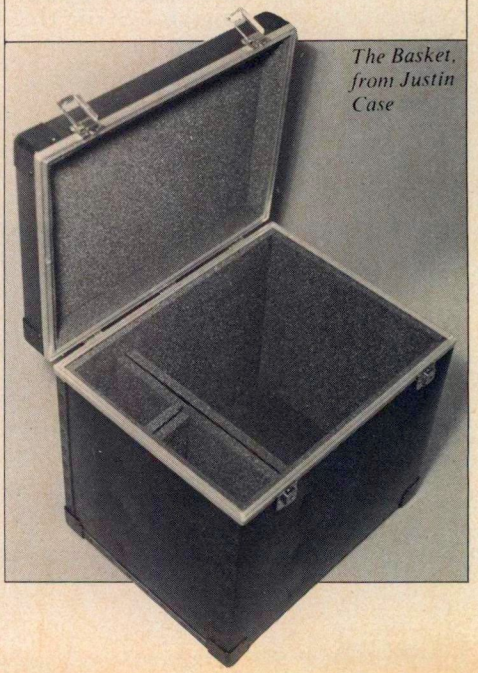

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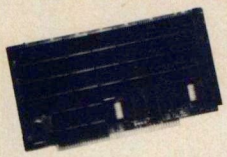

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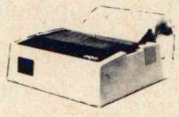

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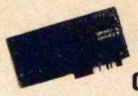

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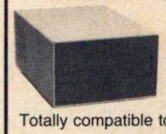

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A sampling of APPLESEED Bus components:

CPU BOARD The 6502 has been removed from the mother board and included in this card, which also contains the clock circuitry for the system.

64K RAM BOARD 64K of dynamic RAM with provision for control to be used in the normal Apple][conventions; deleting COOO-CFFF and software control over the DOOO-FFFF area.

EPROM BOARD Jumper selectable for 2716 (EPROM) or 34199 (PROM); blow 2716 assembly language programs and then run them in this EPROM board. Jumpers allow selection of software on/off, initialize on/off and other controls.

UART BOARD Software/hardware select all standard EIA baud rates. The board supports four 6850 UART's which allow four independent input and output EIA lines. Each UART is fully programmable for parity, bit length, baud rate, etc.

UNIVERSAL BOARD The APPLESEED Universal board contains the following: One 2716 socket for an F8 PROM, one 2K × 8 bit RAM (0-7FF), one UART channel for serial communications, 8 parallel INPUT lines (TTL), 8 parallel OUTPUT lines (TTL), device decode for one additional standard slot-dependent board, support for standard Apple][style keyboard, and a power supply connection. Each feature is independent and any combination may be used simultaneously. The Universal board is designed to be used with the APPLESEED CPU board.

TEXT BOARD The TEXT board is designed to add the conventional TEXT (page 1 and page 2) to an APPLESEED system. The board generates composite video to plug into a standard monitor or T.V. modulator. The board provides 40 columns × 24 rows in each page and is not slot dependent.

MOTHER BOARD 10-slot motherboard is fully compatible with most Apple add-on cards currently available.

Please call or write for prices and more detailed information on these and other APPLESEED Bus products.

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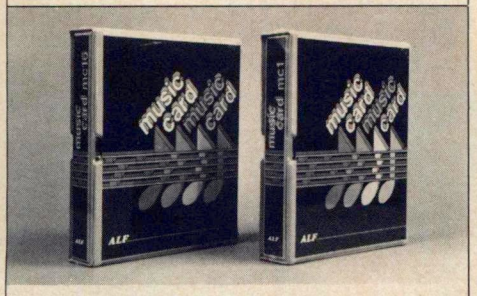
CIRCLE 232 ON READER SERVICE CARD

PRODUCT NEWS

HARDWARE/SOFTWARE

Flashcard-MagiCalc package
The Flashcard plug-in solid-state disk emulator is now available in a package that also contains MagiCalc spreadsheet software, which is fully compatible with VisiCalc files. Flashcard is also available alone with operating diskettes for DOS, CP/M, and Pascal that make it compatible with other programs. *(List Price: $595, Flashcard and MagiCalc software package; $349, Flashcard with operating diskettes, [147K capacity], or $529 [294K capacity])*
Requires: Apple II, II Plus, or IIe
Synetix, Inc.
15050 N.E. 95th
Redmond, WA 98052
(206) 881-7110; (800) 426-7412
CIRCLE 519 ON READER SERVICE CARD

ALF's Music Cards
Both the nine-voice Music Card MC1 and the three-voice Music Card MC16 now have new software that includes extensive editing functions to make it easier for novices to enter songs and play them back. New playback routines allow you to change tempo at any point and allow you to play several songs in sequence, and a new program lets you experiment with sound envelopes and create new loudness contours. You can also now call a playback routine from your own Applesoft program. *(List Price: $169, Music Card MC1; $179, Music Card MC16)*
Requires: Apple II, II Plus, IIe, or III (MC1 only)
ALF Products, Inc.
1315F Nelson Street
Denver, CO 80215
(303) 234-0871
CIRCLE 520 ON READER SERVICE CARD



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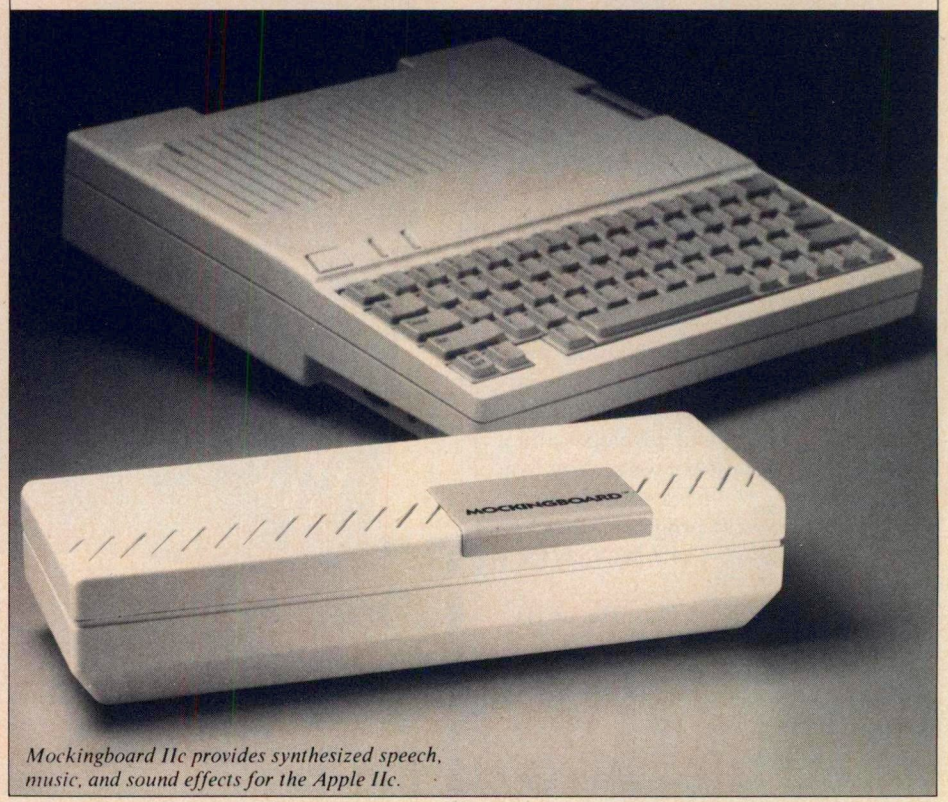
PRODUCT NEWS

SOFTWARE

Keyprint
Keyprint is a configuration program that allows users to have complete menu control of the character sets and font-type abilities of their Epson MX, RX, and FX dot-matrix printers. The program is designed for nontechnical users, and its menu contains more than 20 options, including double-strike, compressed, and italicized character sets. *(List Price: $59.95)*
Requires: Apple II or IIe, Epson printer
SoftKey Software Products, Inc.
2727 Walsh Avenue
Santa Clara, CA 95051
(408) 986-8148
CIRCLE 521 ON READER SERVICE CARD

Mockingboard System for the Apple IIc
Owners of the IIc can now enjoy games and other programs enhanced with Mockingboard IIc sound and speech, including stereo music, sound effects, and synthesizing capabilities. Mockingboard IIc simply plugs into one of the outlets on the back of the IIc, and it is ready to run. Mockingboard enables the IIc to produce highly intelligible speech with unlimited vocabulary. Its text-to-speech algorithm allows users to adjust the speech for inflection and character. *(List Price: $195)*
Requires: Apple IIc
Sweet Micro Systems
50 Freeway Drive
Cranston, RI 02920
(401) 461-0530
CIRCLE 522 ON READER SERVICE CARD

Phi Beta Filer
A file- and list-management program designed for home use, Phi Beta Filer consists of two disks, one of which contains ready-to-use forms. The program uses on-screen command summaries, color, and sound, and it can sort both alphabetically and numerically. It can also print labels, tables, columns, and tallies. The Quiz Master function lets you develop games. *(List Price: $49.95)*
Requires: Apple II Plus or IIe, 48K RAM, one disk drive
Scarborough Systems, Inc.
25 North Broadway
Tarrytown, NY 10591
(914) 332-4545
CIRCLE 523 ON READER SERVICE CARD



Mockingboard IIc provides synthesized speech, music, and sound effects for the Apple IIc.

Dollars and Sense and Bank Street Writer

Monogram's Dollars and Sense personal financial-management program is now available for the Apple IIc. As well as having the original program's 120 record-keeping categories of five different types, this new version enables you to use a mouse, includes two levels of detailed Help screens, and has been improved for easier use with a single disk drive. Monogram has also joined with

The Apple IIc version of Dollars and Sense takes advantage of the computer's mouse.

Brøderbund to release Dollars and Sense and the Bank Street Writer word-processing program for the Apple IIc.

The Apple IIc version of Bank Street Writer offers mouse control, a new tab capability, display of and control over page breaks, and a Copy function. Both programs offer you a choice of a 40-column or 80-column display on the Apple IIc. *(List Price: $119.95, Dollars and Sense; $189.90 for package containing Dollars and Sense and Bank Street Writer)*

Requires: Apple IIe or IIc, 128K RAM, one disk drive, 80-column card for Apple IIe.

Monogram
8295 South La Cienega Blvd.
Tanglewood, CA 90301
(213) 215-0529

Brøderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170

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LJK Enterprises **DATA PERFECT**	130	91
BPI Systems **GENERAL ACCOUNTING**	395	288
Continental **CPA GENERAL LEDGER**	250	174
Muse **SUPER TEXT HOME OFFICE**	125	86
Muse **SUPER TEXT PROFESSIONAL**	175	122
Sensible **SENSIBLE SPELLER**	125	87
Sorcum **SUPER CALC 2 (Z-80)**	295	208
Artsci **MAGICALC**	150	98
Stoneware **DB MASTER V.4**	350	254
Dow Jones **MARKET ANALYZER**	349	261
Dow Jones **MARKET MANAGER**	299	224
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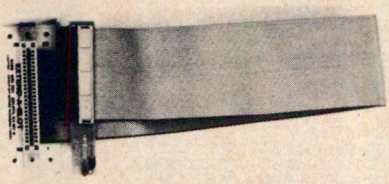

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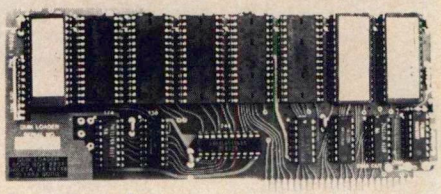

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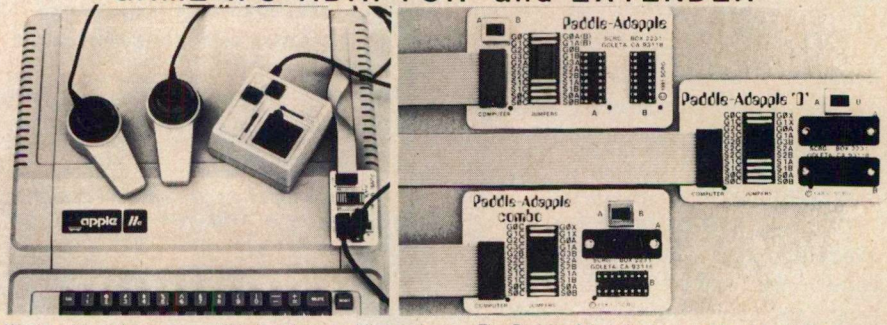

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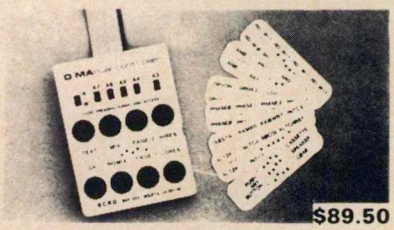

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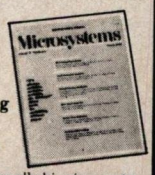

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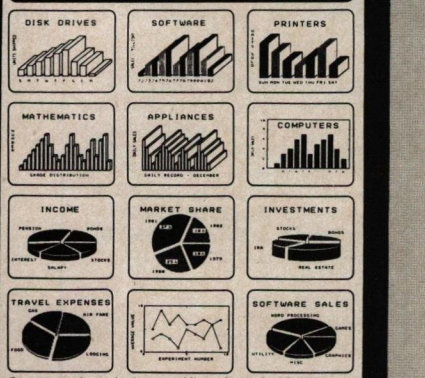

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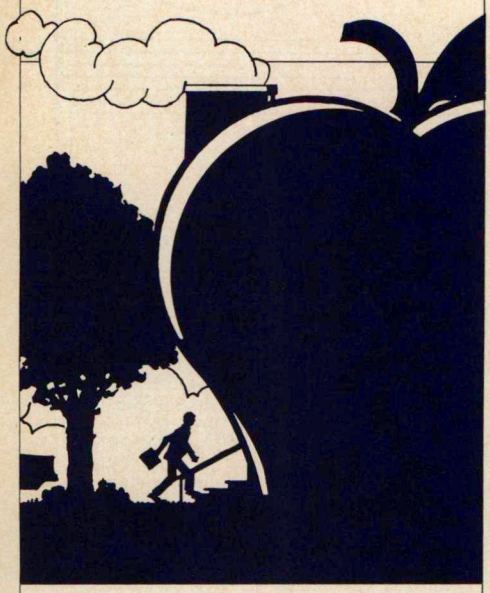

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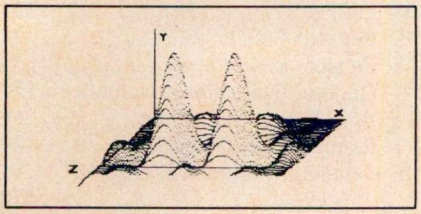

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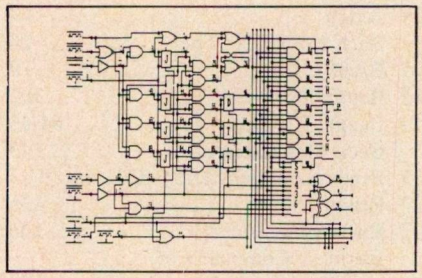

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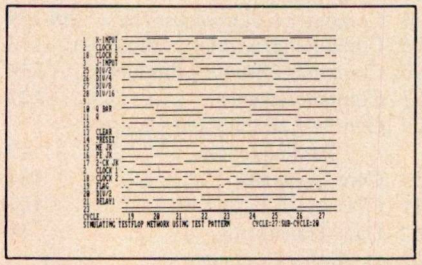

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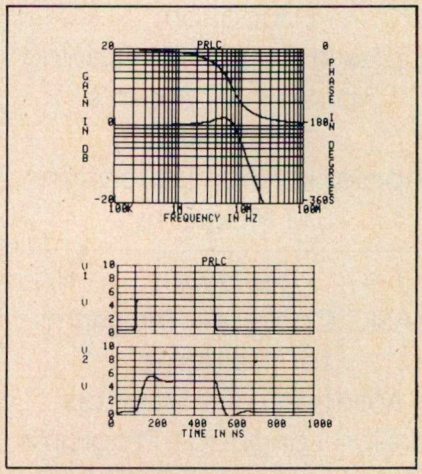

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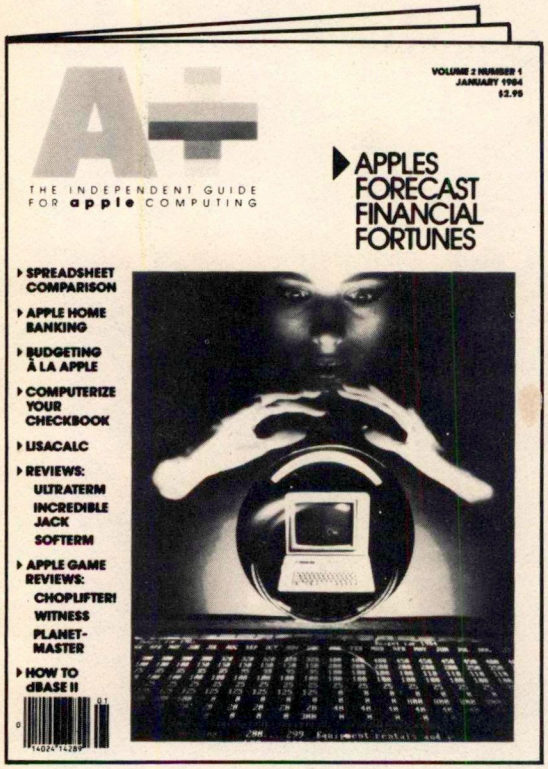

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